The RUBBER AGE

VOL. 27, NO. 11 SEPTEMBER 10, 1930

LATE NEWS of the Industry

Some Factories Announce Curtailment; Goodyear Cuts Salaries by 10 Per Cent

DESPITE curtailments reported at some tire plants, August consumption of crude rubber in the United States was estimated at approximately 30,000 tons by members of the Rubber Exchange of New York. This would compare with 29,894 tons in July and would bring consumption for the first eight months to 276,076 tons as against 347,657 tons in the same period last year.

It has been reported that the Goodyear Tire & Rubber Company is reducing its output this month to around 38,000 tires daily as against last month's level of about 45,000 tires a day and may shut down for a week during the period. The Firestone Tire & Rubber Company plans to go back to a four or five-day week basis in order to reduce stocks to the lowest possible point by November 1. Until the end of last month, Firestone had been running 24 hours a day, six days a week.

The B. F. Goodrich Company, however, plans no serious cut in output, J. B. Tew, president, declaring that the September schedule calls for 21 full working days, which represents practically no change from the August schedule. Among the smaller firms, the Samson Tire & Rubber Company is working 24 hours a day and turning out 6,000 tires and 10,000 tubes daily at Los Angeles, while the Norwalk Tire & Rubber Company, Norwalk, Conn., is at 80 per cent of capacity. The McClaren plant at Charotte, N. C., of the Ajax Rubber Company is at full capacity and making 1,500 tires daily, more than ever before, due to the closing of the firm's Wisconsin factory.

On September 1, the Goodyear Tire & Rubber Company reduced all salaries of sales and office forces, including executives, by 10 per cent. The company is employing 20 per cent less salaried workers at present than at the peak last year. P. W. Litchfield, president, commenting on the cut, said, "In any period of expansion, administrative and sales costs are prone to increase faster than production costs, both in average salaries and in number of personnel. Conversely when business is depressed the factory worker is the first to feel the effect of reduced production schedules. As production tickets are cut, sales and administrative costs increase unless they are kept in proportion to sales volume. At the same time, the decline in the cost of living which always accompanies a period of depressed business, gives another advantage to the salaried workers in that it automatically brings an increase in wages in view of the larger purchasing power of the dollar.

"The company's business in 1930 has been satisfactory considering the total volume of the tire industry in America, but the public has bought fewer tires. While the 20 per cent cut from the peak in the number of salaried employes represents an effort to bring administrative costs more nearly in line with total volume of business, the salary adjustments of 10 per cent which affects all sales and office people, merely parallels the adjustments due to rotation in the factory proper continuing as many people on the payroll as is possible and equitable. By strengthening the company's position in a highly competitive market, these adjustments should as well strengthen the position of its employes."

Fisk Rubber Company Lost $2,651,822 During the First Six Months of 1930

THE semi-annual financial report of the Fisk Rubber Company, Chicopee Falls, Mass., reveals a net loss of $2,651,822 in the six months ended June 30, 1930, after write-downs of crude materials, depreciation, interest and reserves for commitments. This compares with a net loss of $236,713 in the first half of the preceding year.

Gross sales during the period amounted to $23,114,441 as compared with a total of $30,083,471 in the first six months of 1929. The balance sheet of the company shows current assets of $21,617,586 and current liabilities, exclusive of 5½ per cent notes due January 1, 1931, of $1,952,861, leaving a working capital of $19,664,725. Including the notes, current liabilities amounted to $10,152,361, and working capital was $11,465,225.

Profit and loss deficit as of June 30 amounted to $8,717,615. Inventories, at the lower value, whether cost or market, amounted to $13,629,323, a reduction from the figure of $14,457,457 reported at the end of 1929.

Reductions in tire prices and the steady downward course of the crude rubber market have contributed to the Fisk losses this year. In June the company announced that it would concentrate its automobile tire production at its Chicopee Falls plant, leaving only bicycle tires and sundries to be turned out at its western unit at Cudahy, Wis., which was originally the Federal Rubber Company. The capacity of the Wisconsin plant was limited, and the change was

said to have been made to reduce manufacturing overhead and costs.

Notices announcing the immediate closing of the Fisk tire fabric mill at New Bedford, Mass., "for an indefinite period," were posted in the mill on August 25 and became effective at once. The entire plant is affected, including all organizations, even the office force. The Fisk fabric mill had been operating for the past three months at full single shift capacity, but was not running two shifts as was formerly done. About 400 day-shift workers were affected by the shutdown.

The Fisk Rubber Company has not shown operating profits since 1927, its losses amounting to $8,791,251 in 1928 and $7,496,457 in 1929. Improvement in the company's affairs seemed likely in early 1929 when Fisk common stock spurted from $9 to over $20 a share and the firm sold 851,306 shares of new stock at a price of $11 a share. Since then, however, it has fallen to new low levels and is now being quoted in the neighborhood of $1.50 a share. The company's 5½ per cent notes, maturing next year, are being sold on the New York Curb Exchange at about $37, while its 8 per cent sinking fund bonds, due in 1941, are traded in on the New York Stock Exchange at about $65.

The consolidated income account of the Fisk Rubber Company for the six months ended June 30, 1930, compares as follows with the preceding three years:

	1930	1929	1928	1927
Gross sales	$23,114,441	$30,083,471	$30,989,846	$40,876,877
Exp., etc	23,022,302	28,372,528	†34,189,731	‡37,772,111
Oper. profit	$92,139	$1,710,943	*$3,199,885	$3,104,766
Other inc.	28,660	11,456	30,781	12,812
Total profit	$120,799	$1,722,399	*$3,169,104	$3,117,578
Depreciation	1,020,898	1,095,586	1,059,144	
Int., amort., etc.	954,805	863,526	754,886	1,135,271
Fedl. tax				265,000
Inv. adj. & res.	¶796,920			
Net loss	$2,651,822	$236,713	$4,983,134	§$1,717,307

*Loss. †Includes write-down of crude rubber inventory and crude rubber in finished goods and work in process to market value at June 30, 1928. ‡Includes depreciation. §Profit. ¶Writing down of crude material and reserve for commitments.

Standard Oil Will Extend Tire Sales; Tire Selling Subsidiary Reports Loss

PREPARATIONS for further extension of the plans of the Standard Oil Company of New Jersey for selling automobile tires and tubes at its owned and operated service stations has been indicated in the *Lamp*, organ of the company. It was stated that preparations are now under way to extend the new service through the marketing fields of the Imperial Oil Company, Ltd., the Humble Oil & Refining Company and the Standard Oil Company of Louisiana. Actual sales are being contemplated by the latter company within the present month.

Meanwhile, the Colonial Beacon Oil Company, which has been selling Atlas tires since shortly after its acquisition in January, 1929, by the Standard Oil Company of New Jersey, has reported for the six months ended June 30, 1930, a net loss of $1,316,164 after expenses, interest, depreciation, etc. This compares with a profit of $530,509 before federal taxes in the first half of 1929. The company's gross income was cut only slightly from $3,801,902 to $3,654,940, but its operating expenses jumped from $2,388,734 in 1929 to $3,860,124 this year.

Clarifying the company's purposes and policies in undertaking the sale of the equipment, the *Lamp* indicated that there was no intention to affect the price structure of the tire industry or to force the tire business out of any of the existing channels of distribution. This, it was said, is in part borne out by the company's marketing policy in which it will attempt to maintain itself in a competitive position, taking a place between the price of the standard brands of tires on the one hand and the mail order tires on the other hand.

The *Lamp* continued: "It is a well established principle that the individual dealer's prosperity is reflected directly in the business of the company whose product he sells, and the inclusion of commission retail stations as well as 100 per cent dealers and company owned service stations in the tire arrangement is intended to give the independent dealer handling 'Standard' products a further legitimate advantage to strengthen his business.

"As in the case of Colonial Beacon and the Standard Oil Company of Pennsylvania, tires and tubes will continue to be supplied by various leading manufacturers under contracts specifying quality and construction, and will be marketed under the brand name, 'Atlas.' Furthermore, in order to assure the buyer that the product he is getting has the full backing of the oil company itself, the Standard Oil Company of New Jersey covers every tire with its own guarantee. The same is true of other subsidiaries handling the product."

In regard to the matter of competition for the dealers from the mail order houses, the *Lamp* stated, "In the past, the dealer labored under an appreciable handicap in his sales of automobile tires because of competition from mail order houses which he was powerless to meet. Naturally, these agencies, because of the volume of their purchases, were in a position to offer tires direct to the consumer at lower prices than could the dealer. This handicap the company found itself able to lessen considerably."

Thermoid Company Reports Net Profit Reduced to $283,294 for First Half

FOR the six months ended June 30, 1930, the Thermoid Company and wholly owned subsidiaries reported net profit of $283,294 after depreciation, interest, federal taxes, etc., equal to 75 cents a share on 256,026 no-par common shares, after payment of preferred dividends. In the corresponding period of 1929, net profit was $464,850, equal to $1.38 a share on the common stock. While sales dropped 19% as compared with a year ago, a sizeable reduction in expenses this year helped to maintain net despite the various reserves and charge-offs set up.

The company charged maintainence expenses of over $71,000 against operations, in addition to depreciation amounting to $57,966. The latter item totaled $51,993 in the first six months of 1929. Had not the extraordinary charge-off of $71,000 been made, and about $38,000 been deducted for depreciation of raw materials, in addition to the normal depreciation, earnings available for the common stock would have been appreciably above the $198,123 shown.

Earnings of the Southern Asbestos Company, 93% of which is owned by Thermoid, were not included in the Thermoid report. The Southern Asbestos report for the first six months showed net for that company of only $38,000. An inventory shrinkage of $295,000 was charged against surplus. All or part of this inventory adjustment might have been applied to the 1929 period, it was said, and thus not affected this years' operations. However, the company announced that it plans to recover amounts due it because of previous overstatements of inventory condition. The normal annual net profit is calculated at between $350,000 and $400,000.

Thermoid Company's balance sheet as of June 30 showed current assets at $2,441,353, against current liabilities of $573,696, giving a ratio of more than four to one. Current assets did not include an item of $109,596 cash and notes reserved for sinking fund payment due August 1, 1930, and the company's investment in Southern Asbestos Company of $3,953,137 at cost was carried under fixed assets. Goodwill, patents, trademarks and processes were

carried at $1. The current liabilities figure included about $164,000 of items outside of immediate operation expenses of the business, such as federal tax reserve, etc. Southern Asbestos Company's balance sheet showed a current ratio of more than 10 to 1.

Thermoid Company directors in July, due to the lower earnings, voted to omit the common dividend of which two quarterly payments of 50 cents each had been made earlier in the year. Preferred dividend payments for the first half of 1930 were earned more than three times over.

Since the common stock of the Thermoid Company was listed on the New York Stock Exchange two months ago, it has declined from 26⅞ to 11 and is currently selling only slightly above its low point. Last year the common sold on the New York Curb Exchange as high as 38, while the 7 per cent preferred touched a high of 112¾. This year the preferred has dropped from 87 to 65 and is now selling a little above the latter figure.

Raybestos-Manhattan, Inc., Made Profit Of $825,499 During First Half of 1930

RAYBESTOS-MANHATTAN, Inc., has reported for the six months ended June 30, 1930, a consolidated net income of $825,499 after charges, depreciation and federal taxes, equivalent to $1.22 a share on 675,000 no-par shares of common stock. This compares with earnings of $2,098,530, or $3.10 a common share, in the first half of 1929.

The consolidated net income for the quarter ended June 30 amounted to $374,524 after all charges, equal to 55 cents a share, and comparing with $450,975 or 67 cents a share in the first quarter of the year. Each operating division of the company showed a net profit. Sales for the first six months of the current year amounted to $9,571,451 as compared with $12,785,382 for the same period in 1929.

Current assets of Raybestos-Manhattan, Inc., as of June 30, 1930, were $9,955,082, and current liabilities $1,056,415, making a ratio of more than 9 to 1. Cash funds, including readily marketable securities, were $3,215,177 and were more than three times the current liabilities. Total assets were $19,490,922 and there were no bank loans or funded debt. The surplus of the company at June 30 was $8,099,873.

A few months ago the directors authorized the purchase of additional equipment for the manufacture of V-type rubber belts for use on transmission drives in various kinds of industrial machinery. These belts were formerly used only for driving automobile fans. The directors also authorized the purchase of additional equipment for the Manhattan Rubber Manufacturing Division to enlarge production by 300 per cent in the department making asbestos molded brake linings and clutch facings through a combination of rubber and short fibred asbestos, a process which has already proved a profitable addition to the company's main operations. Close to 50 per cent of the corporation's total volume of business is maintained by the Manhattan Rubber Manufacturing Division.

Directors of the company have declared the regular quarterly dividend of 65 cents a share on the capital stock. This will be paid September 15 to stock of record at the close of business on August 30.

The income account of Raybestos-Manhattan, Inc., and its constituent subsidiaries compares as follows for the six months ended June 30:

	1930	1929	1928
Net sales	$9,571,451	$12,785,382	$11,120,710
*Net before depreciation	1,098,854	2,411,249	1,589,911
Depreciation	273,355	312,719	287,150
Net income	$825,499	$2,098,530	$1,302,761

*After federal taxes, adjustment of inventories, etc.

PROGRAM OF THE RUBBER SECTION, NATIONAL SAFETY COUNCIL

Tuesday Afternoon, September 30

2:00—Remarks by the General Chairman, J. T. Kidney (Goodyear Tire & Rubber Company).
2:15—Report of the Engineering Committee by the Chairman, C. B. Mitchella (Republic Rubber Company).
2:30—Report of the Statistics Committee by the Chairman, Howard W. Low (Miller Rubber Company).
2:45—Report of Nominating Committee and Election of Officers.
3:00—A. P. Regal (Philadelphia Rubber Works Company). *Rubber Reclaiming and Its Hazards.*
3:25—Discussion led by Charles F. Smith (U. S. Rubber Reclaiming Company).
3:45—W. T. Leonard (Ohio Industrial Commission). *How We Can Best Serve the Injured Employe.*
4:15—Discussion.

Wednesday Afternoon, October 1

2:00—M. A. Clark (United States Rubber Company). *Creating Job Value Consciousness.*
2:45—Dr. P. A. Davis (Goodyear Tire & Rubber Company). *Safeguarding the Health of the Rubber Worker.*
3:15—Discussion.
3:45—M. J. Maryanski (B. F. Goodrich Company). *Safety in Design of Equipment in the Rubber Industry.*
4:15—Discussion.

Thursday Afternoon, October 2

2:00—C. L. Hungerford (Firestone Tire & Rubber Company). *Carry On.*
2:45—W. H. Fleming (Goodyear Tire & Rubber Company). *A Foreman's Opportunity in Accident Prevention.*
3:15—Discussion.
3:30—T. G. McKenna (Goodyear Tire & Rubber Company). *Safety Kinks* (Film Strip).

All sessions in Annex Room, Main Floor, Fort Pitt Hotel, Pittsburgh, Pa.

Rubber Section to Play Important Part At Annual Safety Congress in Pittsburgh

SAFETY engineers of the rubber industry will convene at Pittsburgh, Pa., at the end of this month, together with safety men in other industrial lines, for the 19th annual Safety Congress and Exposition. These sessions, which are held under the auspices of the National Safety Council, will extend from September 29 to October 3 and will be featured by sectional meetings, round table discussions, a "smile party" and a banquet at which Rear Admiral Richard E. Byrd will speak.

The Rubber Section sessions will extend from September 30 to October 2 and will include eight prepared papers, discussions, reports by the statistical and engineering committees, and the nomination and election of officers as shown in the above program. These meetings will be held in the annex room on the main floor of the Fort Pitt Hotel and will be under the supervision of J. T. Kidney, Goodyear Tire & Rubber Company, as general chairman, and C. L. Hungerford, Firestone Tire & Rubber Company, as vice-chairman.

The Safety Congress will have many other features of interest to rubber men, including a display of mechanical safety appliances which will utilize two floors of the William Penn Hotel. At the session of the Employes' Benefit Association Section on the morning of October 2, Dr. R. S. Quinby, of the Hood Rubber Company, will discuss "Lessening the Financial Burden of Employes' Benefit Associations."

(Other news of the industry will be found on Pages 599-605)

Domestic Rubber Business Far Behind Last Year

First Half Production and Sales More Than 20 Per Cent Under 1929, With Recession Especially Marked in Tires and Tire Sundries

THE general business recession during the first half of the current year was reflected in the American rubber manufacturing industry by a marked decline in output and sales. The total sales value of manufactured rubber goods shipped during the first six months of the year fell 22 per cent below the figure for the same period of 1929, while production, as measured by the consumption of crude rubber, dropped 20.2 per cent under last year. These facts are revealed by statistics compiled by the Rubber Manufacturers Association, Inc., from questionnaires covering the full first half year.

The actual value of all shipments of manufactured rubber products in the first half of 1930 totaled $457,538,000, as compared with $586,886,000 in the first six months of last year. Bathing apparel, sporting goods, toys and novelties were the only items showing a gain in sales over the first half of last year. Tires and tire sundries experienced a decline of 26.2 per cent in sales value during the period.

In amount of crude rubber used, there was a decline from 267,857 tons in the first half of 1929 to only 213,702 tons in the first six months of this year, according to the association figures. The decrease in the case of tires and tire sundries amounted to 22.9 per cent, but in other rubber products the drop was only 2.7 per cent, and several items, notably sporting goods, heels and soles, showed gains.

Figures for the second quarter of this year show the total sales value of manufactured rubber products as $239,223,000, as compared with $218,315,000 in the first three months and with $312,863,000 in the second quarter of 1929. Crude rubber consumption in the second quarter totaled 112,092 tons, as against 101,610 tons in the first quarter and 139,292 tons in the second quarter of last year. During the second quarter of 1930, tires and tire sundries absorbed 94,507 tons of rubber as against 17,585 tons for all other products.

Reclaimed rubber consumption is shown to have totaled 43,853 tons in the second quarter, comparing with 43,853 tons in the first quarter, and making a total of 87,517 tons for the first half year. The questionnaire reports show stocks of crude rubber on hand at the end of June as 154,187 tons, with 59,182 tons afloat to this country.

The decline in production is strikingly shown by the fact that the total daily average number of employes in the industry on the basis of the third week of April was 144,553 this year as against 170,856 in 1929.

The figures presented in the table below are estimated by the Rubber Manufacturers Association to represent 92 per cent of the American manufacturing industry, but those quoted in this article have been raised so as to represent 100 per cent of the domestic industry.

Comparative Table of Value of Rubber Goods Shipments from Manufacturing Plants and the Amount of Crude Rubber Consumed for the Last Five Quarters

Total Sales Value of Manufactured Rubber Products Shipped

Thousands (,000) omitted.

	Product	2Q-30	1Q-30	4Q-29	3Q-29	2Q-29
	Tires and Tire Sundries					
1	Auto and Truck Casings	$121,882	105,939	102,267	169,903	165,571
2	Auto and Truck Tubes	17,215	15,619	14,758	23,604	24,011
3	Motorcycle Casings and Tubes	253	243	199	405	426
4	Bicycle Casings and Tubes	621	534	631	877	785
5	Aeroplane Casings and Tubes	130	83	63	100	144
6	Solid and Cushion Tires	2,683	2,374	3,149	4,752	5,049
7	All other Solid Tires	324	335	320	721	747
8	Tire Sundries and Repair Materials	3,167	3,712	3,614	4,737	4,141
	TOTAL—Tires and Tire Sundries	$146,275	128,839	125,001	205,099	200,874
	Other Rubber Products					
9	Mechanical Rubber Goods	$26,578	24,149	23,200	28,234	30,926
10	Boots and Shoes	17,683	20,148	36,301	31,266	22,303
11	Insulated Wire and Insulating Compounds	7,256	7,089	8,230	8,963	7,734
12	Druggist Sundries, Medical and Surgical Rubber Goods	1,827	1,626	1,545	2,409	1,957
13	Stationers' Rubber Goods	564	585	601	631	646
14	Bathing Apparel	1,636	709	234	503	1,597
15	Rubber Clothing	1,012	1,083	2,610	2,696	1,868
16	Automobile Fabrics	2,179	2,230	1,892	3,267	3,021
17	Other Rubberized Fabrics	1,612	1,506	2,904	2,751	2,099
18	Hard Rubber Goods	1,220	1,257	1,679	1,889	1,640
19	Heels and Soles	4,659	5,945	5,792	6,298	5,895
20	Rubber Flooring	1,117	1,029	1,189	1,366	1,137
21	Sporting Goods, Toys and Novelties	3,307	1,793	1,356	2,002	2,676
22	Miscellaneous, not included in any of above Items	3,161	2,862	2,482	2,815	3,461
	TOTAL—Other Rubber Products	73,811	72,011	90,015	95,090	86,960
	GRAND TOTAL — All Products	$220,086	200,850	215,016	300,189	287,834

Crude Rubber Consumed—Long Tons

	Product	2Q-30	1Q-30	4Q-29	3Q-29	2Q-29
	Tires and Tire Sundries					
1	Auto and Truck Casings	$70,430	61,642	48,244	69,220	89,261
2	Auto and Truck Tubes	13,887	12,384	10,096	13,813	17,038
3	Motorcycle Casings and Tubes	91	96	47	61	87
4	Bicycle Casings and Tubes	299	345	401	349	279
5	Aeroplane Casings and Tubes	19	15	25	66	60
6	Solid and Cushion Tires	1,089	1,577	1,873	2,175	2,733
7	All other Solid Tires	104	72	106	224	293
8	Tire Sundries and Repair Materials	1,153	1,149	792	1,152	1,317
	TOTAL—Tires and Tire Sundries	$87,072	77,280	61,584	87,060	111,068
	Other Rubber Products					
9	Mechanical Rubber Goods	$5,728	4,628	4,692	5,785	6,022
10	Boots and Shoes	3,750	4,944	5,534	4,873	4,740
11	Insulated Wire and Insulating Compounds	965	999	1,050	976	717
12	Druggist Sundries, Medical and Surgical Rubber Goods	423	318	469	545	487
13	Stationers' Rubber Goods	369	386	280	316	375
14	Bathing Apparel	222	254	155	103	223
15	Rubber Clothing	271	312	356	471	369
16	Automobile Fabrics	293	231	252	342	365
17	Other Rubberized Fabrics	417	471	681	709	512
18	Hard Rubber Goods	302	279	236	381	317
19	Heels and Soles	1,694	1,952	1,677	1,635	1,471
20	Rubber Flooring	303	261	282	285	298
21	Sporting Goods, Toys and Novelties	620	511	362	344	30
22	Miscellaneous, not included in any of above Items	821	655	472	821	755
	TOTAL—Other Rubber Products	16,178	16,201	16,498	17,586	17,081
	GRAND TOTAL — All Products	$103,250	93,481	78,082	104,646	128,149

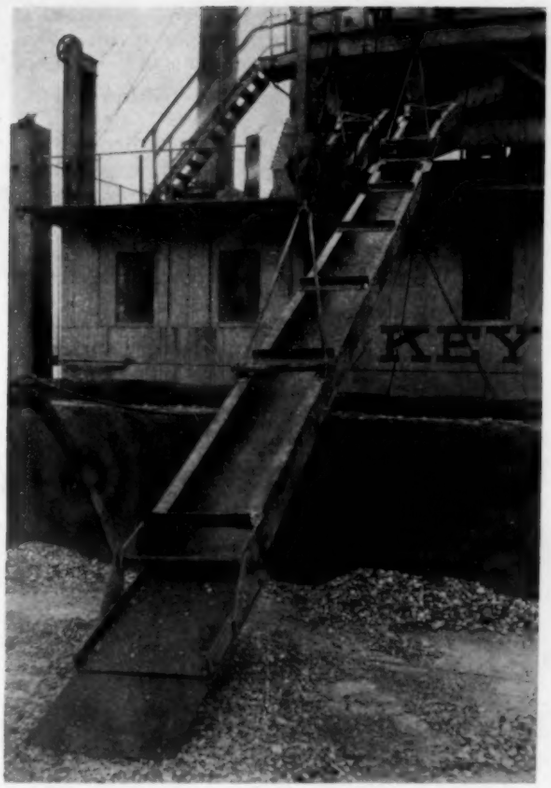
Latest Applications of the VULCALOCK Process in Industry

Rubber Successfully Attached to Wood or Metal—Adhesion Tests Show Tensile Strength in Excess of 700 Lbs. Per Sq. In.

By H. E. Fritz
The B. F. Goodrich Company

THERE has been a broad expansion in the application of rubber for industrial purposes during the past few years. Uses hitherto unknown have become standard practice of today, resulting as they have in lower operating costs and greatly increased service. The range of physical properties, uses and costs of the many different rubber compounds are probably as great as the variation in iron and steel and their alloys.

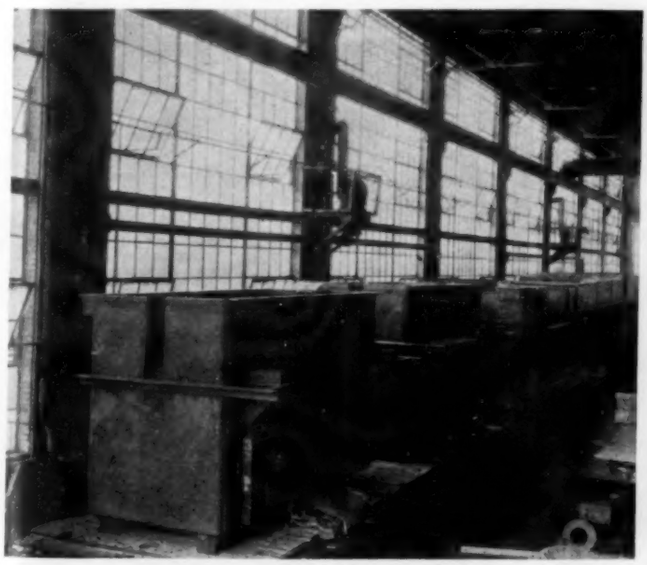
Rubber has many admirable qualities, but its corrosion and abrasion resisting properties hold greatest interest for engineers. Utilization of these properties of rubber has always presented a difficult problem owing to certain limiting factors such as lack of rigidity, tensile strength, etc. Discovery of the "Vulcalock Process," by which rubber is bonded to metal, has overcome some of these limiting factors and has placed in our hands a new construction material which has aided greatly in solving the baffling problems of corrosion and abrasion.



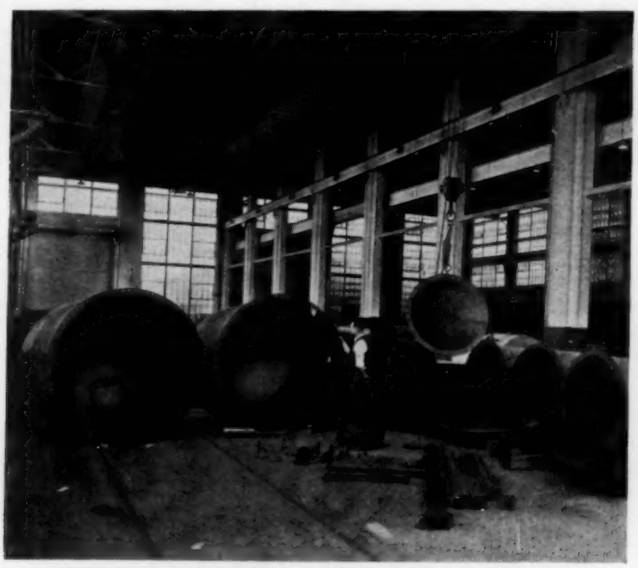
Rubber Lined Gravel Chute on Dredger Lined by Vulcalock Process. On the Chute the Rubber is 3/8" Thick and Outwears 10 Steel Plates

The Vulcalock Process

Through a process of elimination and an accumulation of experience the laboratories of a large Akron rubber manufacturer have discovered a process which permits of soft rubber being applied directly on smooth iron or steel surfaces. Adhesion between the two materials is so complete that they appear to be integral, and the bond approaches the tensile strength of the rubber itself.



Vulcalock Plating Bath Tanks Leaving Goodrich Factory



Vulcalock Process Tanks for Handling Glacial Acetic Acid

Adhesion tests have been made to show a strength in excess of 700 lbs. tensile strength to the sq. in. The new process has been found successful in attaching rubber to other metals, such as brass and aluminum, also to wood and concrete.

The pliable, semi-plastic gum is applied to the cleaned metal surfaces and cured in place, and it is during the curing operation that the remarkable adhesion is set up. The only limiting factor of the Vulcalock attachment is heat, and at present its application cannot be conservatively recommended where the operating temperature exceeds 150° Fahr.

Corrosion

There has been a long-felt need in industry for a corsion-resisting construction material which, when subjected to general factory conditions, would be serviceable over an appreciable period, regardless of shock, strain and vibration, which are often present to a degree sufficient to eliminate the use of anything fragile in character. Such a

Vulcalock Tank Car for Handling 85% Phosphoric Acid

material would greatly decrease replacement and maintenance cost, and might lead to a revival of manufacturing processes which are at present in the discard. The Vulcalock Process has contributed largely to the development of such material.

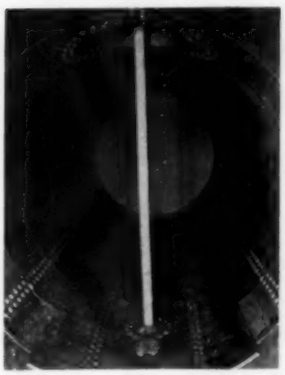
The field has appeared sufficiently attractive for large rubber manufacturers to concentrate their efforts on producing compounds to effectively resist corrosion and rapid progress has been made in the solution of manufacturing problems and methods of mechanical attachment. Rubber is now effectively resistant, without contamination, to all the acids except nitric and highly concentrated sulphuric. Rubber will successfully resist the corrosion of 50 per cent sulphuric acid and 85 per cent phosphoric acid, and the common corrosives such as hydrochloric acid and hydrofluoric acid; salt solutions present no problem at all when stored and transported in rubber-lined containers.

Abrasion

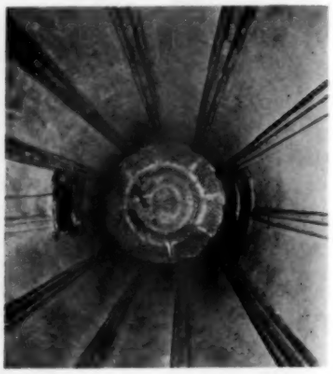
It has been known for some time that a good grade of rubber has a remarkable ability to resist abrasion and special study has been given to the compounding of rubber for various kinds of abrasion-resisting service. Rubber technologists have at last been successful in developing a grade of rubber which possesses remarkable abrasive resisting properties and which, when properly applied, will many times outwear steel of the same thickness. For those who are not familiar with this quality of rubber, the remarkable resistance to abrasion of the rubber tread of an automobile tire which frequently travels upwards of twenty thousand miles and successfully withstands severest abrasion and abuse may be cited as a convincing example. Everyone who has used skid chains knows that the hard alloy steel links, when exposed to bare brick or concrete, will wear to a point of failure in a few hundred miles while the tread of a good tire, absorbing abusive impact and friction, will show no appreciable signs of wear.

A large manufacturer of abrasives required a machine to mix finely abrasive material and bronze arms were used in the mixer to eliminate a certain undesirable contamination, which would have occurred if iron or steel arms had been used. These bronze wearing parts gave a life of only six weeks and were a source of trouble and expense. To test its effectiveness one of the arms was covered with ⅛ in. rubber. This thin coating has now been in service for 10 months, and is reported to be still in excellent condition.

The operators of a sand dredge in the Ohio River placed a sheet of rubber at the discharge of a 36 in. conveyor and there was concentrated over a very small area in a period of seven months the impact and scouring action of 250,000 cu. yds. of sand and gravel. It was observed that the rubber outlasted ten steel plates of the same thickness in the same service with a substantial saving in cost over a steel plate and an incidental saving of time and labor. It was also remarked that this piece of rubber could have been made to deliver forty times the service of steel had it been favored and shifted so that the wear would have been more evenly distributed over the entire surface. A number of similar instances could be cited where rubber,



Interior of Vulcalock Tank Car for Transporting Muriatic Acid. View Shows Reinforcing Pad Below Manhole



Rubber Lined Ball Mill Showing 1" Thick Rubber Slabs Held in Place by Steel Retaining Bars

properly applied, is meeting the need as an effective covering in places where abrasion to a destructive degree is present.

The lining of steel tanks, receptacles and tank cars with soft rubber is proving acceptable in the ceramic, chemical and allied industries, and rubber is taking the place of less corrosive-resisting and more fragile linings. Railroad tank cars have been lined by the Vulcalock Process in sufficient numbers to have developed a standard method for the lining. Special equipment has been provided and special men have been trained in this class of work. It is desirable to have a tank shell with a smooth, clean inside surface so that the rubber will conform to the metal surface and cure in place with uniform thickness, without any open joints, which would destroy the purpose of the lining.

The same process has been successfully used for the attachment of tubed or sheet rubber in standard steel pipe and fittings, including special valves. The rubber is so applied that all metal contact is eliminated, giving the pipe a three-fold utility, to resist abrasion, to resist corrosion and to conduct liquids which are subject to contamination from metal contact. Rubber-lined tanks and pipes will

(*Continued on page* 592)

Anti-Friction Bearings in Rubber Mill Equipment

Improvements, Both Economic and Practical, Follow the Use of Such Mountings—Speed Requirements Reduced—Lubrication Problems Simplified and Operating Costs Decreased—Load Determinations Studied

By W. B. Moore

Assistant Manager, Industrial Department, The Timken Roller Bearing Company

IT is not surprising, for several reasons, that the possibilities of anti-friction bearings as applied to rubber mill machinery have aroused a great deal of interest. The production of rubber has at least one point in common with any variety of industrial production; the need for the greatest possible economy. And anti-friction bearings have demonstrated their ability to reduce operating costs over and over again. Rubber mill machinery, especially the heavy duty machinery, offer plenty of opportunities for improvement from a bearing standpoint. Their proper lubrication has always been a difficult problem to solve satisfactorily; their power requirements can be reduced to advantage; and the bearings quite often have a decided influence on the quality of the finished product. So, when bearings were developed capable of meeting the mechanical and physical requirements of the service it was not long before the research work necessary to apply them properly was commenced.

Since the physical and mechanical requirements of the service, especially the loads, are such an important factor in bearing selection, a brief description of the methods of load determination may be of interest. Two such methods are customarily used by the engineers of The Timken Roller Bearing Company, that have both worked out very effectively in practice. The first, and in some ways the most satisfactory, is what is known as the hydraulic cylinder, equipped with a plunger, as shown in Fig. 1, and filled with glycerine, is put in the mill, between the

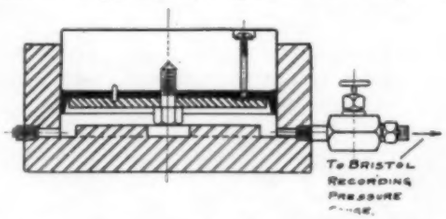


Fig. 1. Cross-Section of the Hydraulic Cylinder Used to Obtain Data on Bearing Loads

bearing block and the roll adjusting screw. The cylinder is then connected by a flexible tube to a Bristol pressure recording gauge. The mill screw is run in, as for normal operation, and the mill run through a complete production duty cycle. As the batch goes through, the spreading force on the rolls causes pressure differences in the cylinder, which are permanently recorded on the gauge. Comparison with a calibration chart previously prepared gives a direct reading of the load in pounds at any particular point in the duty cycle. One of the principal advantages of this system is the recording of peak duration as well as volume, the former being just as important from a bearing standpoint as the latter. Also, since the record is permanent, it can be analyzed at leisure.

The second, or Brinnell method, was developed for use in cases where the mill construction sets space limitations that prevent the use of the hydraulic cylinder. The equipment consists of two hardened steel plates, one smooth and the other recessed to take a number of hardened steel balls, and the requisite supply of balls. The plates with the balls in place are put in the mill, as shown in Fig. 2,

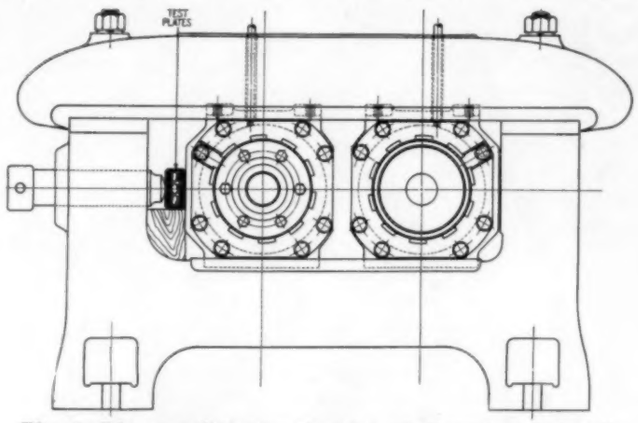


Fig. 2. Diagram Showing Method of Mounting Brinnell Plates and Balls in a Mixer to Obtain Data on Bearing Loads

the mill screw run in for normal operation, and a batch run through the mill. The spreading force on the rolls forces the balls into the smooth plate, the depth of the indentation being proportional to the load on the rolls. The plates are then removed, and the impressions carefully measured and duplicated in an Olsen machine. The sum of the recorded pressures required to duplicate the impressions gives the value of the maximum load on the bearings. The advantage of both of these methods lies in the fact that they can be used to obtain information under actual production conditions, without interfering with the operation of the machine being tested.

Thanks partly to the accurate information on load

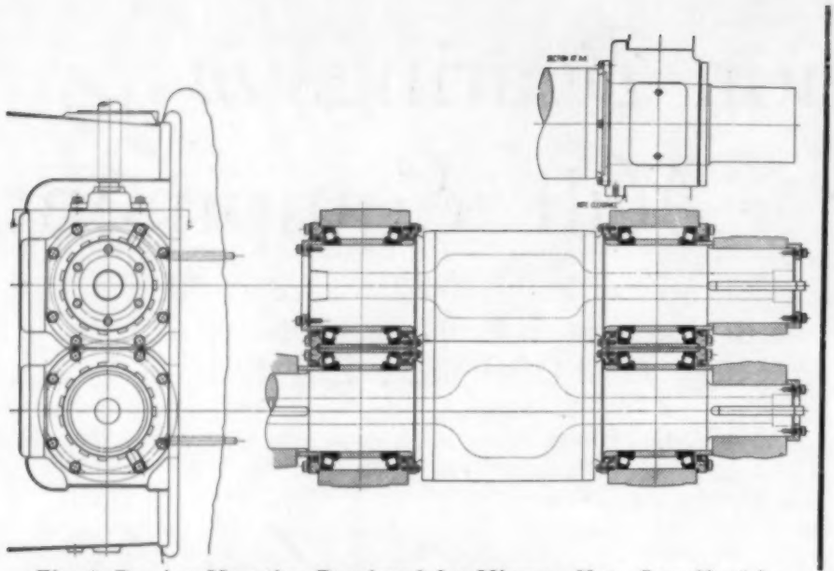


Fig. 3. Bearing Mounting Developed for Mixers. Note Care Used in Designing Closures to Prevent Escape of Lubricant

characteristics thus obtained, and partly to a thorough study of the other factors involved, it has been possible to design mountings for anti-friction bearings for every type of heavy duty machine. As a matter of fact, development has been carried to a point where the mountings for the different machines have been practically standardized. How the various requirements have been met in actual practice can probably be seen from a consideration of the various mountings in detail. Fig. 3 shows the mounting that has been developed for mixers. The load characteristics in this particular case include heavy peaks, of comparatively short duration, combined with a high sustained load. This fact, as well as the magnitude of the loads encountered, is brought out in Fig. 4. The bearing mountings have been made as simple as is consistent with strength, and general lasting qualities; it will be noted that particular attention has been given the lubrication problem. Two single row bearings, of capacities which give an ample safety factor over any peak loads likely to be encountered, are mounted at each end of the roll. The bearing cones, or inner races are given a light fit on the shaft, being located axially by a sleeve, or ring which is pressed against a fillet on the shaft. A spacer ring which is also given a light fit on the shaft serves to separate the cones. The cups, or outer races are pressed into the housing, the spacer being omitted, as their relation with the cones serves to hold them in position. The method of locating the bearings is simple, but very effective. On those shafts carrying gears, or pinions, the bearings are located by a spacer between the gear, or pinion, and the outer cone, so that when the former are correctly placed, the bearing is properly located. On the dead end a flanged cap which is bolted over the end of the shaft serves the same purpose as the gear. The closures, and especially the inner ones, are quite elaborate, as a precaution against any possibility of the escape of lubricant. The inner closure is provided with a movable ring which presses against the felt, and which can be tightened down to compress the felt, and seal the housing against the escape of lubricant. In mounting a clearance is left between the bearing block and the pedestal at one end of the roll. This permits the roll to expand and carry the whole block with it, and eliminate any danger of binding, or otherwise disturbing the bearing set-up.

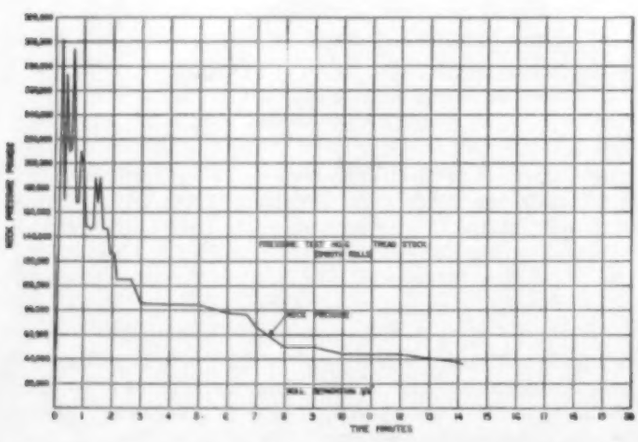


Fig. 4. Curve Plotted from Load Readings Showing Magnitude and Duration of Loads During One Characteristic Duty Cycle of a Mixing Machine

In some respects the load conditions in refiners are very like those in mixing mills, with the particular exceptions that the peak loads are somewhat smaller, while the sustained loads are greater. Consequently the method of applying the bearings has been modified to take care of the increase in sustained load. As can be seen from Fig. 5, two double row bearings are used at each end of the roll, so that there will be a more even distribution of load, and a greater normal capacity. In this case, too, the bearings are selected to provide a high factor of safety. The cones are given a light fit on the shaft, and separated by a lightly fitted spacer ring. The cups are given a light fit on the shaft, and separated by a spacer ring that is provided with holes at frequent intervals that permits the lubricant to work out and form a film between the cups and the housing to prevent scuffing. The method of locating the bearings is precisely the same as that already described in the case of mixers. It will be noted that the closures are not quite as elaborate as those used on mixers, but they are just as effective in retaining the lubricant and excluding dust or dirt. The same provision is made for

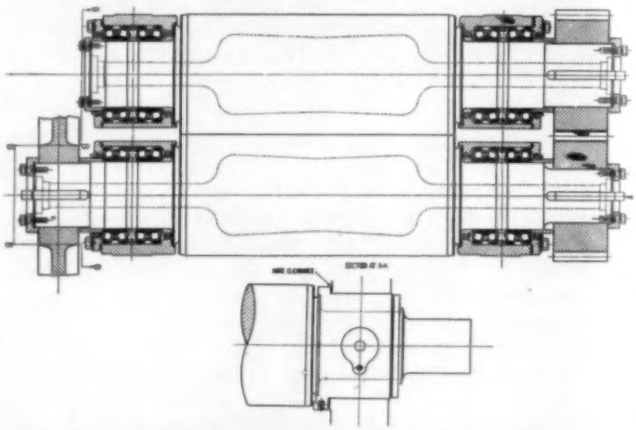


Fig. 5. Typical Bearing Mounting Developed for Refiners. The Provision for Taking Care of the Heavier Sustained Loads is Quite Evident

shaft, or roll, expansion as has been described, and for the same reasons.

As to Banburys, the bearing requirements, and consequently the mountings that have been developed to meet them, correspond so closely to those already described, that it is hardly worth while describing them in detail. It should be said, however, that the same high factor of safety has been provided, and the same care taken to assure effective retention of the lubricant, and to assure its protection from contamination from outside sources.

In the case of calenders, the bearing requirements differ radically from those already outlined. Peak loads are practically negligible, but the sustained loads are very high, because of the heavy, constant pressure maintained between the rolls. The bearing mounting developed for this service is shown in Fig. 6. In order to distribute the pressures evenly, four rows of rollers are mounted on each end of the roll. The cones are given a loose fit on the neck, accurately ground spaces being placed between them. The cups, together with a spacer, are pressed into the housing. A groove is provided in the housing directly back of the spacer so that lubricant can work its way in, and prevent the center rolls from pumping themselves dry. The assemblies are individually located at each end by a split ring which fits into a slot in the neck, and is threaded for the reception of a locking ring. One of the features of the design is the elaborate closure that have been adopted, especially on the inboard side of the respective assemblies. The lower section consists of a machined forging which is fitted on the shaft, and which has a vertical slot on its inner face. The bearing housing proper is provided with a projection that fits into the slot, and, as an additional precaution the lower face grooved. Finally there is a felt ring on the vertical face that makes a rubbing contact with the inner surface of the slot in the forging. This may seem unduly involved until the importance of eliminating even the possibility of lubricant coming into contact with the material on the rolls is considered. The outer closure is comparatively simple, consisting of annular grooves in the closure plate, and a felt ring at the outer edge. The felt may be compressed to compensate for wear by a follower, which is locked against backing out.

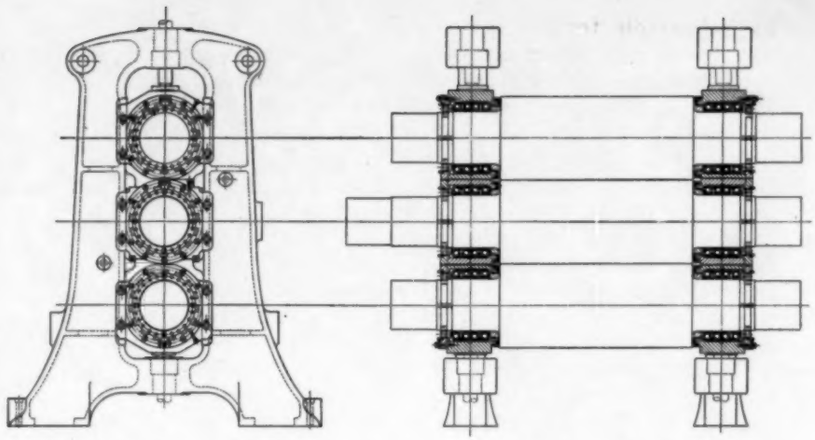


Fig. 6. Bearing Mounting Developed for Calenders

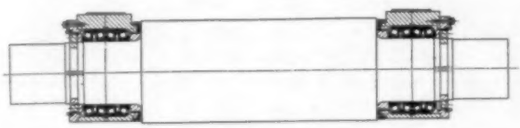


Fig. 6a. Close-up of Calender Mounting Showing the Closure Design Adopted to Seal the Lubricant in the Housing

The load characteristics of tube machines and strainers, while very similar to each other are radically different from those of the machines already discussed. In this case the thrust load greatly exceeds the radial load; so much so in fact, that the mounting is practically designed on a thrust load basis. In these machines, even greater attention is paid to lubrication problems, since the danger of contaminating the product is more acute. A typical mounting for such a machine, where the thrust loads may often run up to several hundred thousand pounds, is shown in Fig. 7. The mounting includes two bearings, one a steep angle bearing that carries the heavy thrust load, and the other a smaller, standard bearing that serves to carry the radial load of the gear. The bearing cones are pressed on the shaft, and the cups into the housing, the whole assembly being located by shims between an end plate and the end of the shaft. The thrust bearing is selected with a capacity that will provide an ample factor of safety under any conditions of service.

The closure design is interesting; that at the screw end of the shaft, where the greatest danger is, being practically solid, while that at the gear end is simpler, but quite effective. Since the whole interior of the housing

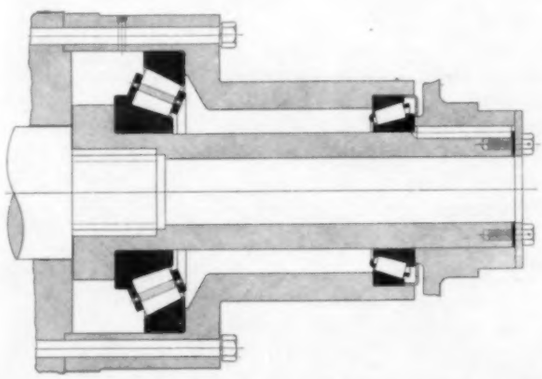


Fig. 7. Bearing Mounting Developed for Thrust Block of Heavy Duty Tube Machine and Strainers

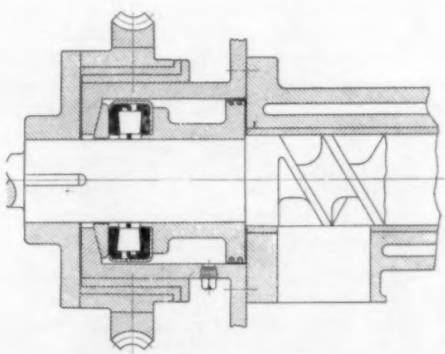


Fig. 8. Bearing Mounting Developed for Tube Machine When Duty is Comparatively Light

acts as a reservoir for the storage of reserve lubricant, frequent renewals are never necessary. Although this type of mounting is standardized, some modifications have been developed to fit the case of certain machines. One of them, shown in Fig. 8, has been developed for use on machines of low capacity. Since the loads are much lighter, it is possible to employ a correspondingly simple bearing arrangement. A simple tapered thrust bearing at the end of the screw shaft is mounted on a sleeve that fits tightly on the shaft, and which is provided with a flange that forms the inner closure. The outer closure is formed by the clutch. By virtue of this arrangement the thrust load of the screw is transmitted directly to the bearing housing, which is bolted to the chamber. It can be seen from the figure that the interior of the housing forms an ample reservoir for lubricant storage, and that the closure at the screw end is calculated to prevent even the slightest leakage of lubricant.

Advantages of Such Bearings

So much for the technicalities. As for the improvements, both economic and practical, that follow the use of these mountings, they could be dismissed briefly by a statement to the effect that they are radical. To be more specific, there is hardly a phase of machine operation that is not affected for the better. In the first place, in the heavy duty machines, power requirements are reduced. In the case of mixers, or refiners, which are driven in lines, the result is a practically flat power demand, which permits reducing the initial horsepower of the drive to a point more consistent with economy. And, where machines are individually driven, as is the case with calenders, and tube machines for example, the power requirements of the machines themselves are reduced. Which may not be particularly important if only the individual machines are considered, but which may amount to a very respectable sum in the aggregate. And, there is another factor to be taken into account, especially in the case of line driven machines. It is not necessary to regulate batching in so as to prevent synchronous peak loads on the machines of the line. So that, generally speaking, the rate of production of the line can be increased without any undue strain on the driving equipment.

Probably one of the most important advantages is the simplification of the lubrication problem. Or, to put it differently, the possibility of eliminating spoilage from lubricant contamination, without in any way impairing the effectiveness of the lubricating system itself. This situation has always existed in rubber machinery, and the problem of meeting it satisfactorily has never been thoroughly settled, hitherto. The use of anti-friction bearings has provided a solution that is, at present at least, without detectable weaknesses. For another thing, which is especially important in the case of calenders, the rigidity with which the rolls are held, and the absence of wear in the bearings over long periods of time make roll settings permanent in character. This means that rejects from variation in the gauge of calendered material are practically eliminated, which is in itself a very material item of saving.

The foregoing takes no account of the other economic possibilities, such as the saving in maintenance expense, or that for upkeep and lubrication. These do exist, however, to a degree that makes their consideration well worth while. On the whole, the statement that their use will improve production from every angle is far from exaggerated.

LOOKING FOR A JOB? ... There are a number of good positions open in rubber factories. Consult Classified Section, this issue, Page 605.

New Applications of Vulcalock Process

(*Continued from page* 588)

withstand internal pressure corresponding to the strength of the metal. This permits tanks to be discharged and contents transported safely by air pressure, eliminating pumps.

Ball Mill Linings

Limited application has been found for rubber linings in rotary grinding mills. Linings have been in use since 1921. After the first few installations have been made and the basic principles found to be sound, the development of a commercial lining was considered along two separate lines: First, to produce a standardized lining which could be installed in the field without making any objectionable or costly changes in the construction of the mill, at the same time giving the rubber a positive anchorage in the mill, and eliminating metal from wearing contact. Second, to determine the limitations of the lining in regard to varying conditions of operation, so that recommendations could be made to prospective users.

It was found that in most dry grinding operations heat is generated by friction, which sometimes builds up a temperature sufficiently high to cause premature failure of a rubber lining. Rubber linings should not be considered for dry grinding applications where the temperature exceeds a conservative limit of 150° Fahr. Laboratory and field tests show that severe impact varies in direct proportion to the thickness of the rubber. Therefore, as the size of individual balls, which make up a grinding charge, increases, a rubber lining must increase in thickness in proportion sufficient to absorb the impact without a damaging effect. From the many tests it has been concluded that the rubber lining is best suited for cylindrical type mills used in the wet process grinding of fine materials, requiring small balls, that give a large grinding surface.

Some chemical manufacturing operations require pigments to be ground in contact with corrosive liquors. This presents a problem of protecting the interior of the grinding mill from corrosion as well as abrasion. Rubber offers a solution to this combination, and the Vulcalock Process makes it possible to line a mill completely without seams, so that corrosion protection is complete and positive.

Cutless Rubber Bearings

Since the inception of the screw propeller on ships, there has been a constant search for a bearing which would satisfactorily carry the load of the propeller shaft under the adverse conditions which always prevail at the stern tube or strut.

Within the last few years a new bearing, consisting of a metal sleeve, lined with a tough, resilient rubber compound, similar in texture to a good automobile tire tread, bonded to metal by the Vulcalock Process, has given such phenomenal service when installed in struts and stern tubes in various classes of service that it bids fair to supplant the standard lignum-vitae constructions along with the various mechanical contrivances which have been designed to obtain a metal bearing surface.

Conclusion

The splendid cooperation given the rubber industry by far-sighted engineers is the real reason for some of the new and special uses of rubber. The field of possible application is so broad and intricate that it is practically impossible for engineers in the rubber industry to acquaint themselves with all of the problems involved. It is therefore logical to expect that many of the future developments in rubber will come from outside the rubber industry.

Toxic Substances *in the* Rubber Industry

PART XIV

By P. A. DAVIS, A.B., M.A., M.D.

Assistant Medical Director, Goodyear Tire & Rubber Company

Cadmium and Its Compounds

CADMIUM is a tin white metal, closely associated with zinc and is similar to zinc in its properties. It can be crystallized in octahedron crystals. It melts at 321.7° and boils at 778°. When vaporized, the vapor has a dark yellow cast and a very disagreeable odor. It can be deposited on dissimilar metals electrolytically and will take a very high polish. Cadmium is not used so very extensively in industry, but is associated with zinc as an impurity in most commercial processes.

Uses of Cadmium

1. Preparation of low melting alloys
2. Manufacture of certain electrolytic cells
3. Plating processes
4. Rubber industry
5. Zinc smelting
6. Manufacture of brass
7. Occasionally used in medicine as an astringent and stimulant

The principal use of cadmium in the rubber industry is as a pigment where the sulphide is used and the metal is used in certain plating processes.

The principal compounds of cadmium are as follows:

CdO	$Cd(OH)_2$	CdS
Cd_4O	$Cdcl_2$	CdSO4
Cd_3O_2	CdI_2	$Cd(NO_3)_24H_2O$
Cd_2O		

Cadmium is similar to zinc in its reactions and uses but is several times more toxic. The fact that where the most dangerous percentage of cadmium is present there is also present the most dangerous percentages of lead, arsenic and zinc and many cases of cadmium poisoning has been ascribed to lead, arsenic and zinc, but with the advancement of industry many pure compounds of cadmium are being used and the metal is being used more than ever in solders and plating. However, the use of cadmium is not extensive and we do not anticipate many cases of poisoning by its use, but one must be suspicious of commercial zinc and lead products when any physical complaints arise from the workers.

The symptoms of cadmium poisoning are very similar to those of lead, arsenic, zinc and antimony in many respects and one must not rely entirely on physical symptoms but must resort to chemical methods of detection of poisons. The insoluble compounds are less toxic than the soluble ones and this is due only to the close chemical combination.

Symptoms

Acute

1. Diarrhea and purging
2. Emesis
3. Giddiness and nervousness
4. Thirst
5. Slow pulse and low blood pressure
6. Slow shallow respirations
7. Temporary loss of taste
8. Constricted feeling in throat
9. Hemolytic action on blood cells
10. Muscle spasms
11. Unconsciousness

Chronic

1. Nausea
2. Loss of appetite and loss of weight
3. Gastro enteritis usually with constipation
4. The blood shows toxic anemia with increased blood dust and platelets and many embryonic cells
5. Albuminuria and later nephritis
6. Enlargement of liver and heart
7. Gradual loss of muscle tone
8. Persistent cadmium taste in mouth
9. Marked dullness and weakness and inability to work

Autopsies on animals show a fatty degeneration of muscles of the heart and a fatty infiltration of the substance of the kidneys, liver, spleen, pancreas and bone marrow. I am of the opinion that an acute condition develops in men who are doing acetylene welding with metal which contains cadmium. I have observed several men who are doing this type of work and they are affected in a very short time unless there is a suction hood placed over the welding process or they wear respirators. The composition of the fumes that come from the welding arc in electric welding is very similar when cadmium is used. The cadmium compounds in this arc vary from the oxide to the sulphide and at high temperatures they are very active chemically. In the acetylene arc there are some volatile organic combinations that exist for a short time only and are very toxic.

Many individuals have been examined who have been working with the yellow sulphide and the only complaints have been as follows:

1. Heavy feeling in chest
2. Occasional slight nausea
3. Occasional conjunctivitis
4. Loss of appetite
5. Metallic taste in mouth

Only 5% of individuals who have been working with this compound have complained of any ill effects. Investigation of the process and complaint show that some of the complaints were due to a solvent that was being used. This was corrected and no complaints have been made.

One hundred and fifty blood tests were made in 1929 on individuals who were working with cadmium sulphide as a paint pigment and the only thing that was present was a slight leucocytosis, increase in the percentage of polys and a slight pallor of the red cells. Urine examinations on these individuals were negative.

Preventive Measures

1. Proper suction ventilation over welding processes
2. Keep dust to a minimum
3. Where cadmium sulphide is used in paint and is sprayed it should be in a closed system or under a suction ventilation
4. Respirators should be worn where welding is done in the open
5. Frequent examination of the workers
6. Instruction of the personnel and frequent inspection of the safety first department
7. Removal of the individual from contact with cadmium compounds when any slight symptom develops

One must investigate the type of cadmium compound being used, whether it is chemically pure or commercial, or whether if metallic it is in combination with any other metal. This is important because a differential diagnosis must be made to rule out arsenic, lead, chromium, antimony, zinc and copper. The effects produced in some cases where these metals are combined may be due to all of them, but the predominating symptom is that of the most toxic ingredient if it is present in any considerable percentage.

Treatment

This consists of two parts namely, the emergency treatment for acute cases and the systemic treatment for chronic cases of absorption.

ACUTE,

1. Put to bed
2. If emesis has not resulted it should be instituted by hot water solutions of flour, mustard or mineral oil
3. If great thirst is present and diarrhea is present, glucose solution should be given intravenously
4. If pulse is low, give caffeine, strychnine or camphorated oil
5. If respirations are shallow, give alpha lobelin
6. If restless or pain is present, give morphine
7. After the acute stage is passed, then strenuous elimination must be instituted

CHRONIC,

1. Removal from contact with cadmium compounds
2. Institute elimination by bowels and kidneys
3. General tonics of iron
4. Hexaresorcinol for kidney irritation
5. Increase the calcium intake
6. Opiates for pain and diarrhea
7. Digitalis for the heart
8. Non-fatty diet
9. Electro-therapy for the muscles
10. Gentle outdoor exercise

Cadmium and its salts are toxic substances, more than zinc, but because of the less common use of it and the small amounts used, one does not see very many individuals who are affected.

The fact that nausea is present is a very good safeguard for most individuals who have nausea, emesis, diarrhea or any heavy feeling in the chest, do not feel like working and at once begin to investigate the cause for it. These factors make fatal cases very rare. With proper preventive measures there should be no cases of cadmium poisoning.

Testing Airplane Tires

DIFFICULTIES in laboratory testing of airplane tires to determine their strength under heavy loads, hard landings and irregular runways are believed overcome with the development by the B. F. Goodrich Rubber Company, Akron, Ohio, of a machine in which the speed of the physical blow struck against the tire is comparable to the landing speed of an airplane.

The testing machine consists of a vertical guide track 100 feet high, down which a known weight is dropped onto a mounted and inflated tire. Exact speed of the weight in dropping from an established height is recorded on a rotating cylinder operated by a synchronous motor. The slope of a line made on the graph by an indicator attached to the weight carriage is used to calculate the speed.

The weight has a maximum speed of 50 miles an hour in dropping. Various types and shapes of detachable weights are used to represent the many obstacles encountered by experience. Flat plates are used where tests concern landing on hard surfaced runways and to test for standing loads.

By making several tests on a single tire with various weights and speeds it is possible to produce accurate laboratory tests comparable to service conditions and the results can be used to determine the best tire materials and constructions.

"U. S." Tire Repair School

OPENING of a tire repair school offering four weeks of free instruction to all repair men numbered among its dealer organization is announced by the tire department of the United States Rubber Company. The school is located in the executive building at Detroit headquarters and is under the immediate supervision of Charles Samson, manager of the accessories and repair materials division. More than 3,300 square feet of floor space have been laid out for the various classes of the school, which is equipped to instruct four groups of twelve students each simultaneously.

The program of instruction worked out for the school is complete and covers not only every branch of service and repair work, but accounting, credit, sales, super-service and every other phase of the tire merchant's business as it pertains to the shop.

Four large rooms have been especially laid out for the school—each being designed to accomodate the needs of the students for one week of the course.

General View of the Vulcanizing Room, Showing the Retread, Sectional and Spot Curing Operations

His first week is spent largely in the lecture room, which is fitted out like a typical school classroom.

During the second week he is given scrap tires in which, supposedly, five injuries are diagrammed. These injuries are repaired and cured and are then cut down to study internal makeup and analyze for defects. After several days of this, the student progresses to shop jobs tires which will go into actual service.

The third week is devoted in the main to both one-third and full circle retreading and tube work, although the regular routine of tire repairs is maintained.

During the fourth week the student is schooled intensively in service. Mounting and demounting practice, checking wheel alignment, correcting wheel defects and other phases of service are stressed. Practical demonstrations in the proper method of sales approach also are given.

KUNHARDT'S "FUTURE OF RUBBER"

COPIES of Lt.-Colonel J. C. G. Kunhardt's very interesting booklet on "The Future of Rubber," extensively reviewed recently both here and abroad, are now available in this country through THE RUBBER AGE. The booklet is published by the Rubber Shareholders Section of the Institution of the Rubber Industry, London, and is a comprehensive survey of present conditions surrounding the plantation industry and concludes with a broad and authoritative view of the possible situation in the future. The book is interesting reading for all those associated with the industry. Sent postpaid upon receipt of 65 cents (stamps or currency) by THE RUBBER AGE, 250 West 57th Street, New York City, N. Y.

Overflow During Vulcanization, Its Dependance Upon Inactive and Active Fillers, and Errors in Previous Calculations of the Specific Gravity of Vulcanizates Resulting from It*

By RUDOLF DITMAR AND CARL HEINZ PREUSSE

Kautschuklaboratorium, Graz.

THE overflow which takes place with every rubber mixture during vulcanization, if it is vulcanized in a mold, is a source of trouble to the rubber manufacturers and is therefore a problem of the greatest economic importance in rubber technology. If raw rubber to which nothing has been added is exposed to vulcanization conditions it becomes soft but does not increase in volume in any way. Quite a different result is obtained if a sulfur-rubber mixture is vulcanized in the conventional way or if an inactive or active filler is added to this rubber-sulfur mixture. In fact, it may be said in general that every case of a vulcanizate with sulfur is associated with an increase in volume.

In connection with an explanation of the overflow the following questions arose:

1. In what way do inactive fillers affect overflow?
2. In what way does an increase of a given inactive filler influence the overflow?
3. Do different inactive fillers influence the overflow in the same way?
4. In what way do active fillers influence the overflow?
5. In what way does an increase of a given active filler influence the overflow?
6. Do different active fillers influence the overflow in the same way?

First to be considered was the overflow of a rubber-sulfur-zinc oxide-accelerator-base mixture prepared in the following way:

Base Mix		Specific Gravity	Volume
Smoked Sheets	10.0 g.	0.89	11.236
Sulfur	0.3 g.	2.07	0.144
Zn oxide	0.5 g.	5.42	0.092
Mercaptobenzothiazole	0.1 g.	1.42	0.070
	10.9 g.		11.542

A ball of 2 cm. diam., *i. e.*, having a volume of 4.1888 cc., was made from this mixture. The calculated specific gravity of the mixture was 0.944, the weight of the unvulcanized ball was 3.98 g., a greater precision was not obtainable.

This, as well as the subsequent vulcanizations, were carried out in a press, thus:

10 min. increase to 143° C.
30 min. at 143° C.

After vulcanization the overflow was carefully cut off and the ball and overflow were weighed:

Weight of ball before vulcanization (the ball was fitted to the mold carefully)	3.98 g.
Weight of ball after vulcanization	3.78 g.
Overflow	0.20 g.
Overflow of base mixture	5.02%

The ball of the base mixture gave under a load of 1 kg. in the Ditmar ball pressure apparatus a counter-pressure of 7 cm. after 14 days' rest after vulcanization.

All subsequent mixtures were treated in exactly the same way.

1. Problem. In what way does whiting (an inactive filler) influence the overflow?

30% Whiting

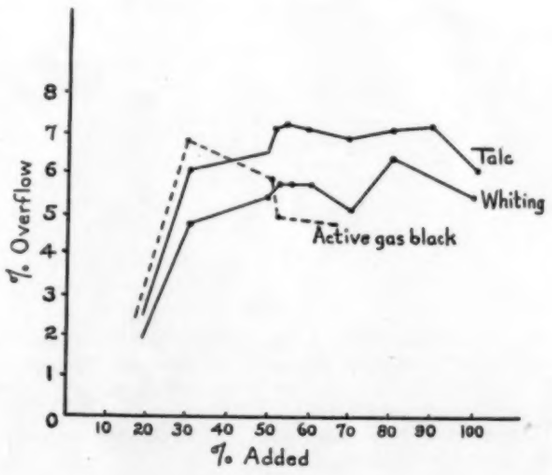
Mixture		Specific Gravity	Volume
Smoked Sheets	10.0 g.	0.89	11.236
Sulfur	0.3	2.07	0.144
Zn oxide	0.5	5.42	0.092
Mercaptobenzothiazole	0.1	1.42	0.070
Whiting (30%)	3.0	2.80	1.071
	13.9		12.613

Experiment No.	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Whiting	30%	50%	52%	55%	60%	70%	80%	90%	100%
Specific gravity of ball	1.102	1.193	1.20	1.214	1.235	1.275	1.313	1.349	1.383
Wt. of unvulcanized ball in g.	4.62	5.00	5.03	5.09	5.17	5.34	5.5	5.65	5.79
Wt. of ball after vulcanization in g.	4.40	4.73	4.74	4.8	4.87	5.07	5.15	5.26	5.48
Overflow in per cent	4.75	5.4	5.7	5.69	5.8	5.05	6.3	6.9	5.3
Ball Pressure in cm.	6.3	6.2	6.1	6.00	6.00	5.7	5.7	5.6	5.5

The next question was whether another inactive filler would give the same per cent of overflow under the same conditions. We selected talc. The investigation may be presented in the simplest and clearest manner in a table:

Overflow With Increasing Proportions of Talc

Determinations	30%	50%	52%	55%	60%	70%	80%	90%	100%
Specific gravity of ball	1.108	1.204	1.213	1.226	1.248	1.29	1.33	1.368	1.405
Wt. of unvulcanized ball in g.	4.64	5.04	5.08	5.14	5.23	5.40	5.57	5.73	5.89
Wt. of ball after vulcanization in g.	4.36	4.71	4.72	4.77	4.86	5.03	5.18	5.32	5.53
Overflow in per cent	6.08	6.54	7.08	7.19	7.07	6.85	7.00	7.15	6.11
Ball pressure in cm.	5.9	5.6	5.0	4.8	4.4	4.2	4.00	3.9	3.6



*Translated from Chemiker-Zeitung, Volume 54, No. 52, pages 501-2, June 28, 1930.

A similar study on active gas black could be carried out up to the addition of only 60% because mixing became very difficult.

OVERFLOW WITH INCREASING PROPORTIONS OF GAS BLACK

Determinations	30%	50%	52%	60%
Specific gravity of ball	1.048	1.104	1.109	1.129
Weight of unvulcanized ball in g.	4.39	4.63	4.65	4.73
Weight of ball after vulcanization in g.	4.09	4.36	4.42	4.50
Overflow in per cent	6.8	5.8	4.9	4.8
Ball Pressure in cm.	6.1	3.4	3.3	2.6

Highly active animal charcoal and finely pulverized silica gel gave no vulcanization with the base mixture studied.

We summarize our important results on overflow in percentages as well as in three curves, from which it is plainly evident that the inactive fillers first cause an increase and then wave-like fluctuations in the overflow, while with active gas black the overflow first increases and then diminishes.

Tabulation of Overflow in Per Cent

	Whiting	*Talc*	*Active gas black*	*Animal Charcoal*	*Silica gel*
Raw rubber, no overflow					
Overflow of 5.02% (base mixture)					
30% Addition	4.75	6.03	6.80		
50% "	5.40	6.50	5.80		
52% "	5.70	7.08	4.90		
55% "	5.69	7.19	—		
60% "	5.70	7.07	4.80		
70% "	5.05	6.80	—		
80% "	6.30	7.00	—		
90% "	6.90	7.10	—		
100% "	5.30	6.11	—		

did not vulcanize

The newly discovered fact that vulcanized rubber and vulcanized rubber mixtures have a greater volume than similar unvulcanized mixtures, leads to the surprising conclusion that all calculations of the specific gravity of vulcanizates made since the manufacture of rubber goods are wrong, since they have been based on a false assumption that vulcanized and unvulcanized mixtures had equal volumes. The discovery that the volume of the vulcanizate is always larger than that of the raw rubber mixture and therefore the specific gravity of the vulcanizate is always less than the specific gravity of the raw mixture vitiates all previous factory calculations and also an immense number of theoretical considerations. Only by the use of micromill in the study of the processes of vulcanization is it possible to do accurate mixing. The differences in specific gravity are important; for example, with our base mixture the specific gravity of the raw rubber was 0.944, and of the vulcanizate 0.90.

Summary

1. Raw rubber undergoes no change in volume during vulcanization.

2. Whenever it is vulcanized with sulfur there is an increase in volume.

3. Every inactive filler influences the overflow (increase in volume) in a characteristic way during vulcanization.

4. An increase in the proportion of a given inactive filler influences the overflow curve in a manner characteristic of the filler concerned.

5. Different inactive fillers influence the overflow in various ways.

6. Active fillers influence the overflow curve in a different manner from inactive fillers.

7. An increase in the proportion of a given active filler influences the overflow curve in a manner entirely characteristic of the filler concerned.

8. Different active fillers influence the overflow in quite different ways.

9. The specific gravity of a vulcanizate with sulfur is always less than the specific gravity of the corresponding unvulcanized mixture.

10. All calculations of specific gravity heretofore made in the rubber industry and theories related to them are incorrect because they are based on the false assumption that no increase in volume occurs during vulcanization.

11. Specific gravity determinations of mixtures must be based on overflow determinations.

I. R. I. Associateship Examination

THE following was the examination set by the Institution of the Rubber Industry for Associateships in general rubber technology, held in Manchester, Glasgow and London, on July 7:

Examination in General Rubber Technology

(Five questions to be answered.)
(Time allowed, 2½ hours.)

Question 1. Ebonite dust is used in the manufacture of moulded and extruded Ebonite articles. Describe the method of its manufacture and discuss the reasons for its use in various processes.

Question 2. State the various reasons for the use of reclaim in the manufacture of rubber goods and explain why it is still used when rubber is at a very low price.

Question 3. Steel moulds and white metal moulds are used in the rubber trade. State reasons for the use of these types and why both are necessary.

Question 4. Classify the following under the three headings:—

(*a*) Reinforcing.
(*b*) Softening.
(*c*) Cheapening.

Whiting.	Zinc Oxide.	French Chalk.
China Clay.		Carbon Black.
Light Magnesium Carbonate		Silica
Mineral Rubber.		Rubber Substitute.

Question 5. Differentiate between the functions of the Open type Mixing Mill and the Enclosed type, and discuss the advantages and disadvantages relating to each.

Question 6. Work out the theoretical specific gravity of the following compound and give the percentage of rubber by volume.

Rubber	25	lbs. S. G. 0.93
Zinc Oxide	3¼	lbs. S. G. 5.57
Carbon Black	7½	lbs. S. G. 1.75
China Clay	3	lbs. S. G. 2.6
Sulfur	½	lbs. S. G. 2.00

Question 7. Discuss the advantages of spreading and frictioning, respectively, for different types of rubber goods. What other method than calendering is available for the elimination of solvents from rubber proofing processes?

Question 8. What types of raw rubber are available on the market? Give instances for the preference of particular types for specific purposes.

Comparative Exports of Footwear

THE following comparison of United States exports of rubber footwear with Canadian and British exports has been prepared by the Department of Commerce to aid American exporters of similar products in analyzing foreign markets in this class of goods.

Exports of Rubber Footwear From United States, Canada and United Kingdom

First Half	United States	Canada	United Kingdom	Total
	Pairs	*Pairs*	*Pairs*	*Pairs*
1929	5,505,379	4,811,091	1,945,488	12,261,958
1930	4,028,294	4,586,624	1,673,760	10,288,678

Other countries, including Germany, France, Sweden and Austria are important competitors especially in the European footwear trade, and large quantities of special types of rubber footwear are exported from Japan and British Malaya to Far Eastern markets, but the export statistics are not reported by countries in detail and hence cannot be compared with the exports shown above.

Argentina Is America's Best Tire Market

IT comes as a surprise to the layman that the Argentine Republic is the chief market for American tires and the largest market in the world to be supplied with foreign-made tires. Coupled with that, of course, is the fact that it is also the best foreign market for American automobiles. In the matter of tires, three out of every five sold in the Argentine are American made.

United States exports to Argentina reached in 1929 a value of $3,756,242 and during the first six months of 1930 a value of $1,196,850.

It is estimated that at the beginning of 1930 there were 296,224 automobiles, 65,913 trucks, 2,600 busses, and 2,007 motor cycles in use in Argentina. Imports of automotive vehicles in 1929 reached 66,895 cars and 20,544 trucks and busses—nearly a 20 per cent increase over the year before. About 98 per cent of the cars and 95 per cent of the trucks imported were of American origin. All of these cars are imported equipped with tires, as the duties are relatively less on passenger cars than on tires, and most trucks are duty free.

United States Exports of Automotive Rubber Goods to Argentina

	1928		1929		First six months 1930	
Item	Number	Value	Number	Value	Number	Value
Auto. casings	223,010	$2,563,940	292,555	$2,874,143	106,266	$920,431
Auto. inner tubes	157,381	316,647	214,744	320,066	109,236	138,457
Solid tires	4,765	147,853	6,128	188,228	1,200	53,684
Other solid tires	45,575	10,019	20,157	3,812	32,560	4,012
Other casings	452	1,298	59,713	219,892	2,527	7,377
Tire sundries and repair materials	———	148,021	———	150,101	———	72,889
Total	———	$3,187,778	———	$3,756,242	———	$1,196,850

As an interesting feature of the trade, it is claimed that over three-fourths of the French tires imported into Argentina come from the French subsidiary factory in the United States; one-fifth of the American tires come from Canadian plants, and one-fourth of the British tires from the United States subsidiary of the Dunlop organization. Increasing costs of tire manufacture in France, the allocation of foreign markets to Canadian plants, and equalization of factory output are all given as reasons for this system of international tire trade.

The Argentine official import figures show that 6,997,057 kilos of tires and 1,083,667 kilos of inner tubes were imported during 1929. The percentage participation by countries was as follows: United States 55, Canada 11, United Kingdom 14, Italy 9, Germany 6, France 2, and other countries 3.

Unit Sales During 1929

Sales figures kept by the Argentine Association of Tire Importers show the combined sales in 1929 of the 11 leading brands which control over 95 per cent of the business, to have been 529,404 casings and 579,967 inner tubes. Allowing 20,000 casings for other brands and an equal number of tubes, the total sales were in the neighborhood of 550,000 casings and 600,000 tubes.

American and European tire manufacturers usually maintain their own branches in Buenos Aires, which is the case in 9 out of the 15 makes sold in Argentina. One reason is that large stocks of tires must always be kept on hand in Buenos Aires, amounting to a five months' supply, or usually over 200,000 casings and an equal supply of tubes. Stocks on April 1, 1930, however, were comparatively low, 166,616 casings and 172,511 tubes being the combined stocks of the 11 leading makes. Those tire manufacturers which do not maintain branches in Buenos Aires usually have an exclusive distributor to whom they consign stocks or to whom they grant long credit terms.

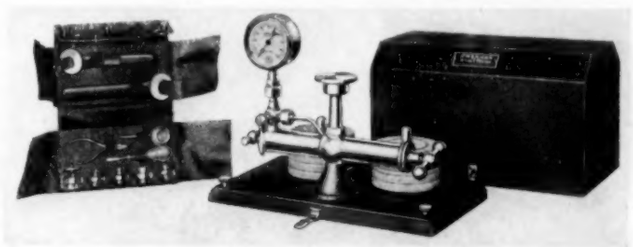
Through their local association, the leading tire importers maintain stability of price, all according the same discounts from their standard printed price lists. The present series of wholesale discounts, cash discount, and annual rebate give the retailer a maximum discount of about 26 per cent. Frequently the retailer gives part of this discount to his customers.

Automobile casings and inner tubes both pay an Argentine import duty of approximately $0.47 a pound. This is equivalent to an advalorem duty of about 100 per cent on casings and 75 to 85 per cent on tubes. Although no tires are manufactured in Argentina, the relatively high duties and the increasing demand have made various tire companies consider establishing subsidiary factories at or near Buenos Aires. One American company is reported to have bought a factory site, to have completed its plans and is about to install a tire factory. The French Michelin, which have had the matter under consideration for several years, is also said to have purchased a factory site. The Italian Pirelli company, which has for some years manufactured rubber-insulated electric cables in Buenos Aires, is enlarging its plant with a view to producing tires. The German Continental and one or two other American firms are likewise said to be considering factories.

Deadweight Gauge Tester

A NEW gauge test instrument, known as the American Deadweight Gauge Tester, is being offered to the rubber industry by the Consolidated Ashcroft Hancock Company, Inc., Bridgeport, Conn. Many processes in rubber manufacture depend for their success or failure on the indication provided by pressure gauges and it is of importance to periodically check the gauges used.

Since the measurement of pressure is actually a measurement of weight, the Deadweight Gauge Tester is really a balanced scale for measuring accurately the pressure.



Deadweight Gauge Tester

Weights equivalent to certain known pressure are placed on the platform which is the upper part of a piston. The cyinder which contains the piston is connected to a pump which also carries the gauge connection. Gauges to be tested are attached to this gauge connection and a pressure developed by means of the pump. This pressure raises the piston and thus provides a definite value by which the gauge may be checked.

Rubber plants in their vulcanizing processes both in the live steam vulcanizers and in the platen press vulcanizers use steam pressures as one of the factors to effect proper curing of the rubber. In even the smallest rubber plants, a great many gauges are thus used and since the gauges themselves do not ordinarily become badly damaged in the course of use, the rubber companies find that they accomplish a real economy in operating costs when these gauges are repaired and retested by themselves. The savings in repair costs are usually sufficient to pay for the instrument within the first year's use.

EDITORIAL COMMENT

Accident Records in 1929

THE rubber industry is making steady progress in establishing a lower accident rate. While the severity rate of accidents in the industry increased slightly last year the frequency rate showed a marked decline. Interest in safety measures in connection with the industry will center in Pittsburgh, Pa., the end of this month when the 19th annual National Safety Congress will hold its sessions. An extensive program has been mapped out for the Rubber Section, which should bring forth many valuable ideas and suggestions for plant safety directors.

The Rubber Section of the National Safety Council was organized in 1919. Nearly 60 rubber organizations, who employ a total of over 100,000 workers, are now cooperating in accident prevention work through this section. The records of the National Safety Council show that the accident frequency rates of the rubber manufacturing organizations which reported for 1929 were about 19 per cent less than the accident rates of 1928, and about 35 per cent less than the rate of 1927.

On the other hand, the severity of the accidents of these establishments for 1929 increased about 10 per cent over 1928 and nearly 30 per cent over 1927. These reports represent the experience of 25 plants. For 1929 alone, 25 different establishments which were specializing in mechanical rubber goods reported an accident frequency rate of 14.24, as compared with accident frequency rates of 22.78 from 14 rubber tire establishments which reported.

Enforced Restriction

AN agreement upon any restriction plan by the British and Dutch Governments seems to be still far off from the horizon. A "meeting of the minds" has failed to be realized. The two governments do not seem to be able to avoid embarrassing obstacles. With the British, a return to restriction would be a confession that they probably did not act with the proper business acumen when they threw over the Stevenson Act. With the Dutch, any restriction scheme would smack of bad faith towards the native planters, who have more or less been encouraged in their individual agricultural efforts by the State.

As the situation is turning out, however, restriction is rapidly being enforced by the low market prices, quite apart from any proposed scheme and the two governments and the stronger producers may be inclined to let matters run along. As the *Financial News* of London points out, uncomfortable as the present conditions may be, the situation of the industry is not utterly without hope. Output is probably now reduced to rather less than the consumption requirements of a normally healthy year, and although visible stocks continue to grow owing to consumption being curtailed by even more potent forces than production, it must be remembered that it is not the total figures for stocks which are significant, but the amount by which the totals exceed what is normal. Even of that excess a good proportion represents rubber which is temporarily shown as visible stocks, but which in ordinary conditions would be in the hands of the rubber industry, still as stocks, but not as stocks visible on the market. The governments no doubt have these considerations in their minds, and may feel that however distressing the situation is now, it is only temporary, and is, therefore, not a fitting subject of legislation.

George Washington Bicentennial

BEGINNING on February 22, 1932, and continuing until Thanksgiving Day of the same year, there will be observed throughout the United States a commemoration of the Two Hundredth Anniversary of the Birth of George Washington. The celebration is sponsored by the United States Government, and Congress has created a commission charged with the responsibility of formulating and putting into operation plans for the event. This commission, officially is known as the United States Commission for the Celebration of the Two Hundredth Anniversary of the Birth of George Washington.

The program now being prepared by the associate directors is intended to provide for the participation of every man, woman and child in the United States. The celebration will extend to every village, town and hamlet.

Business organizations throughout the country have indicated a keen desire to cooperate in this great celebration. Various means are now being devised to utilize the participation of all commercial and civic bodies.

The rubber industry will doubtless participate either as a whole or as individual companies in some phase of this great celebration. When the time comes it will respond with its usual patriotic enthusiasm.

The RUBBER AGE

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Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.

The Rubber Industry's CURRENT NEWS

Financial—Personals—New Rubber Products—
Building Operations—Manufacturing—Exports

PARTS-ACCESSORY TRADE DECLINES DURING SUMMER

July shipments of automotive parts-accessory manufacturers fell below June, as was expected, due to the general seasonal slowing up in the automotive field. Business of suppliers of original equipment to the car and truck manufacturers declined more than usual due to the fact that many of the car and truck plants were closed for inventory and vacation periods during July and were not accepting shipments, according to the Motor and Equipment Association, of which many rubber manufacturers and rubber products distributors are members.

August business was expected to hold up about even with July, but full reports have not yet been compiled for that month. The grand index for all groups of manufacturer members reporting their figures to the association in July stood at 88 per cent of the January, 1925, base index of 100 as compared with 116 in June, 144 in May, and 188 in July a year ago.

AKRON RUBBER WORKERS ENJOY ANNUAL PICNICS

Employes of the large Akron rubber companies and their families took part in the annual outings and picnics sponsored by these organizations during the past month. The events were attended by approximately 75,000 people, a large percentage of the population of the rubber city.

The Goodyear Tire & Rubber Company outing at Chippewa Lake Park on August 16 drew a crowd of 45,000 despite cloudy weather. The big picnic parade was the largest in Goodyear history and was led by two Goodyear dirigibles, the *Defender* and the *Vigilant*. Nearly 4,000 more were in attendance on August 24 at the outing of the Goodyear-Zeppelin Employes' Association.

Approximately 15,000 adults and children were present at the Firestone Tire & Rubber Company outing at the same park, while more than 6,000 enjoyed the Seiberling Rubber Company picnic at Summit Beach Park.

Meeting of A. C. S.

As this issue goes to press, members of the Rubber Division, American Chemical Society, are meeting at Cincinnati, O. The full program and abstracts of all papers to be read were published in the August 25 issue of THE RUBBER AGE, and a complete account of the sessions will be printed in the September 25 issue.

Largest Tire at Los Angeles

A view of the world's largest tire as it rolled into Los Angeles late last month. This giant casing was built at Akron by the Goodyear Tire & Rubber Company last year, and it has since been touring the country as a Goodyear publicity stunt. The casing and wheel each weigh 600 pounds, and the tube, 125 pounds, the whole tire having cost $5,000 to construct. It is 12 feet high and four feet thick, but a noted airplane designer has predicted that aircraft of the future will require tires fully as large as this.

SWINEHART HEAD SUES FOR $246,000 SALARY

A claim for $246,000 against the assets of the bankrupt Swinehart Tire & Rubber Company has been filed by Thomas Walsh, former president of the firm, before Harry Snyder, federal bankruptcy referee. In the petition setting up the claim, Mr. Walsh cites unpaid salary of $136,000 and more than $11,000 in money advanced. He drew no salary from the Swinehart Company from January 1, 1919, to July 1, 1929, the petition states.

Mr. Walsh's claims are being contested by the Poncet Davis Company, the C. P. Hall Company, the English Mica Company, and the Lavine American and Asiatic Company, the creditors who forced the company into bankruptcy last fall. Other creditors declare that the books of the company show no record of its indebtedness to Mr. Walsh.

NORWALK TIRE & RUBBER NEAR CAPACITY OUTPUT

The plant of the Norwalk Tire & Rubber Company, Norwalk, Conn., was operating at 80 per cent of capacity at the beginning of August, according to company officials. During the early part of the month an additional working hour schedule was adopted to meet the steady increases in tire orders.

In a report of its financial condition as of August 1, the Norwalk company shows that the ratio of its quick assets to liabilities is better than 13 to 1. Total quick assets, according to the report, are $824,583, of which inventories are represented by $272,910 and cash by $163,754. Current liabilities include only accounts payable (not due) and accrued wages and amount to $59,226. The company's plant and equipment, less depreciation, are carried at $817,945, making total assets of $1,642,528, and the capital stock and surplus is listed at $1,583,302.

The Norwalk Tire & Rubber Company last month introduced a new type of advertising to dealers when it published its balance sheet as a part of its dealer trade paper advertisements.

BATTERY FIRM RECEIVER SUES HOOD FOR $100,000

The Hood Rubber Products Company, Inc., Watertown, Mass., subsidiary of the B. F. Goodrich Company, was named defendant last month in a suit for $100,000 brought by Francis T. Phillips of Waterbury, receiver for the Hartford Battery Manufacturing Company.

Phillips charges that the financial difficulties of the battery concern were caused by thousands of storage battery cases, alleged to have been defective, which the defendant sold to the Hartford Battery Manufacturing Company.

K & W Rubber Expands

The K & W Rubber Company, Delaware, O., manufacturers of air cushions, mattresses, rings, etc., is adding a mechanical goods department to its present factory and will be in production on several items in this class in the near future. At present the company makes about 125 different articles for homes, offices, hospitals and sports use, in addition to making specialties to any specifications.

The company has had a very good year, according to Ora Krichbaum, president, with its business in Airo Cushions and Airo Mattresses especially active.

NEW OFFICERS NAMED BY R & H CHEMICAL COMPANY

At a meeting of the board of directors of the Roessler & Hasslacher Chemical Company, held August 25, Dr. Edward A. Rykenboer was elected a member of the board, replacing George F. Hasslacher who resigned as director and assistant secretary on July 28.

Dr. Rykenboer is 41 years of age, a man of fine personality, who possesses exceptional executive ability. He is a graduate of the University of Rochester 1912 and took his Ph.D. degree at the University of Michigan where he taught, after his graduation, until 1917. In the same year he joined the Roessler & Hasslacher forces at Niagara Falls as a research chemist and from that position became superintendent of production, and is now general superintendent of the Niagara Falls plant of the Roessler & Hasslacher Chemical Company. The geniality of Dr. Rykenboer makes him a great favorite with his associates.

At the same meeting, J. Carlisle Swaim was elected assistant secretary.

Mr. Swaim is 41 years of age, holding the A.B. 1911 and M.A. 1913 degrees from Vanderbilt University, Nashville, Tenn., also LL.B. 1915 from Columbia University Law School where he also did a year's post graduate work in law. After leaving the Army he became associated with the law firm of Merrill, Rogers, Gifford & Woody, where he remained in the general practice of law until, as resident counsel, he became associated with the Roessler & Hasslacher Chemical Company in November, 1928.

GOODYEAR WORKERS WIN AWARDS FOR SUGGESTIONS

A total of $1,052.50 was recently awarded to 70 Goodyear Tire & Rubber Company employes for their suggestions, according to an announcement by the committee in charge. The maximum award in this group was $160, received by C. E. Bowers for an idea for "war on waste."

J. B. Florence received $125 for a labor-saving idea, and L. L. Speer was awarded the same amount for a "war on waste" suggestion.

KUNHARDT'S "FUTURE OF RUBBER"

COPIES of Lt.-Colonel J. C. G. Kunhardt's very interesting booklet on "The Future of Rubber," extensively reviewed recently both here and abroad, are now available in this country through THE RUBBER AGE. The booklet is published by the Rubber Shareholders Section of the Institution of the Rubber Industry, London, and is a comprehensive survey of present conditions surrounding the plantation industry and concludes with a broad and authoritative view of the possible situation in the future. The book is interesting reading for all those associated with the industry. Sent postpaid upon receipt of 65 cents (stamps or currency) by THE RUBBER AGE, 250 West 57th Street, New York City, N. Y.

Robert J. Firestone

Robert J. Firestone, president of the Standard Tire Company, Willoughby, O., and brother of Harvey S. Firestone, president of the Firestone Tire & Rubber Company, died at Cleveland on September 1 of a heart attack. Funeral services were held on September 4 for Mr. Firestone, who was 57 years old.

He assisted his brother, Harvey, in organizing the present Firestone Tire & Rubber Company 30 years ago and was acting as vice-president and director of sales when he resigned to organize the Standard Tire Company. He was a director and member of the finance committee of the National City Bank of Akron, vice-president and director of the United States Motor Truck Company, Covington, Ky., and was a

R. J. FIRESTONE

trustee of the McCormick Theological Seminary, Chicago, Ill.

Born in Columbiana, O., in 1873, Mr. Firestone at the age of 20 joined his brother, Elmer, in the tire business at Des Moines, Ia. When Harvey S. Firestone went to Chicago in 1895, he joined him there as salesman, returning with him to Akron to organize the Firestone Company. At first he was Chicago branch manager, but in 1907 went back to Akron to become sales manager, being elected vice-president in 1917.

His brother, Harvey S., his wife and three daughters survive him.

MILLER STOCKHOLDER SUES GOODRICH COMPANY

Mary R. Patterson, in her own behalf and as executor of the estate of John B. Patterson, brought suit in common pleas court at Akron last month against the Miller Rubber Company and the B. F. Goodrich Company to compel payment for a fair cash consideration for five shares of stock she owns. She claims she is entitled to the par value of her stock plus a premium and accrued dividends. As a stockholder, she did not give her consent to the consolidation of the two companies, it is pointed out.

The suit asks that three appraisers be named to determine the cash value at the time of the merger, and Attorney Fred O. Smoyer, of Smoyer & Smoyer, said the court will be asked to appoint the appraisers as soon as the defendants are notified.

GOODYEAR SOON TO OPEN INDUSTRIAL UNIVERSITY

The fall term of Goodyear Industrial University will open September 15 at Akron under the auspices of the Goodyear Tire & Rubber Company. Registration for classes in both Goodyear Institute and the Management School began September 2 and will continue until the opening of classes. The Management School is intended for the instruction of foremen and supervisors of the general and factory offices.

A rearrangement of Management School courses has been made this year, several courses being transferred to the Institute to give students more adequate instruction.

Scovill Cuts Dividend

Directors of the Scovill Manufacturing Company have declared a quarterly dividend of 75 cents a share on the capital stock, placing it on a $3 annual basis, against $4 previously. The dividend is payable October 1 to stockholders of record as of September 15. At the end of 1929 the Scovill Company acquired the business of A. Schrader's Son, Inc., Brooklyn, N. Y., maker of tire valves, valve parts and gauges.

Garlock Earnings Lower

The Garlock Packing Company, Palmyra, N. Y., manufacturer of rubber and other packings, has reported net earnings for the six months ended June 30, 1930, of $300,330, equal to $1.49 a common share. This compares with profits in the first half of 1929 of $414,538, or $2.07 a common share.

Rubber Stocks at New Lows

New lows for 1929 or longer were made during the fortnight by Goodyear and Firestone common and Fisk preferred, while most of the other rubber company securities closed appreciably lower than two weeks ago. During the period, however, American Hard Rubber had a 10-point rise to sell at 60, but has since been inactive. Closing prices on September 4 compare as follows.

	Last Price		—1930—	
	Sept. 4	Aug. 20	High	Low
Aetna	—	—	8½	5
Ajax	1	1⅛	2½	1
Amer. Hard Rubber	—	—	81	50
Dayton "A"	—	—	3⅞	3¾
Falls	—	—	4¾	8
Faultless	—	—	37	33¾
Firestone	19⅝	21	33½	19⅝
do. 6% pfd.	72	72¾	87⅞	69¾
Fisk	1½	2	5½	1½
do. 1st pfd.	—	6	21	5⅛
General	—	—	163	130
do. pfd.	—	—	91	88
Goodrich	22¼	23	58½	21
do. pfd.	87	—	104½	78
Goodyear	50¾	63¼	96⅞	50½
do. 1st pfd.	94	—	102	90
India	—	12	25½	8½
Intercontinental	—	2⅞	7½	2⅞
Kelly-Springfield	3¾	3⅝	6⅛	3
do. 6% pfd.	35	—	39	29
Lee	—	—	11	4⅝
Mohawk	9	—	16⅝	8
do. pfd.	—	—	55	15
Norwalk	—	—	4	⅞
Pirelli	39⅞	—	50⅞	39¾
Raybestos-Manhattan	31	30½	58⅞	28
Seiberling	5¾	—	18½	5½
do. pfd.	—	—	78	40
U. S. Rubber	19	20⅝	35	18¼
do. pfd.	38¾	38½	63⅞	38

Names in the News

W. K. WHEATLEY, Pacific Coast manager for the India Tire & Rubber Company, returned last month from a 4,500-mile trip through the seven far western states, during which he visited India dealers and distributers.

J. C. LEHNE has been appointed by the Norwalk Tire & Rubber Company as southern zone manager with headquarters at Atlanta, Ga.

H. E. WILLIAM: has been named general sales manager of the Ajax Rubber Company, taking the place of R. W. ROLAND who resigned to join the Reo Motor Car Company, Lansing, Mich. Mr. Williams was previously Pacific coast division supervisor for both Ajax and the McClaren Rubber Company and has for many years been connected with the sales organization of the latter company.

S. D. CLAYTON, of the United States Rubber Export Company, Ltd., left New York last month for his territory, which covers the Near East and Egypt.

RUTH NICHOLS, well known aviatrix, conferred with officials of the B. F. Goodrich Company at Akron last month regarding the possibility of using their "Miss Silvertown" speed plane in an attempt to establish new speed records for women.

A. C. HORROCKS, educational director of the Goodyear Tire & Rubber Company, spoke at the morning service of the First Baptist Church, Akron, O., on August 24. His topic was "My Work in the World."

FREDERICK W. KNOKE, formerly western district manager of the American Zinc Sales Company, has been appointed assistant manager of sales. He will continue to maintain his headquarters at the company's office in the Paul Brown Building, St. Louis, Mo.

JOHN C. RUTHERFORD, formerly in charge of dealer co-operation for the Pennsylvania Rubber Company, Jeannette, Pa., has been promoted to the post of advertising manager. L. J. WALDRON, sales manager in charge of the New York zone operations, has been put at the head of the New England and Philadelphia territories as well. A. KOEHLER, trade sales manager in the factory zone, has been placed in charge of the Chicago, Dallas, Detroit and Kansas City territories. J. FRANK MOORE, formerly sales promotion manager, has been named assistant sales manager and given supervision over export, bicycle tire and tennis ball sales and placed in charge of the Atlanta, Cincinnati, Memphis and Jacksonville branches. H. H. BOUCHER, district manager of the Los Angeles territory, has been given full supervision of all Pacific Coast operations.

F. K. ESPENHAIN LEAVES FISK RUBBER COMPANY

Frank K. Espenhain, executive vice-president of the Fisk Rubber Company for the past two years, has tendered his resignation which has been accepted by the board of directors. According to an announcement by the company, Mr. Espenhain will take a much needed rest before making any statement regarding his plans for the future, while H. T. Dunn, president of Fisk, will

F. K. ESPENHAIN

take over the work formerly done by Mr. Espenhain in connection with his own activities. This is in keeping with the company's policy of curtailment due to the recession of business.

Prior to his connection with the Fisk organization, Mr. Espenhain has been first vice-president of the Goodyear Tire & Rubber Company. He started his business career in Milwaukee, becoming president and general manager of a large department store in that city. Disposing of his interests, he was engaged in the bond and advertising business when the war broke out.

Entering the service, he was given charge of securing warehouse space for the innumerable materials needed for the use of the A. E. F. in France with the exception of munitions. He attained the rank of colonel through his work. While all industry was mobilized for the war, it was the duty of Colonel Espenhain to find space to store this tremendous production and have it ready for shipment. After the armistice, he went into export work at New York, handling tires and rubber goods.

Mr. Espenhain became associated with the Goodyear organization in September, 1921, as export manager and was subsequently given the duties of assistant to the president, and of vice-president of the company.

WALTER REYNOLDS, well known in the tire business, has been appointed zone administrator for the Dayton Rubber Manufacturing Company in the south central division.

WINFRED E. FOUSE, vice-president of the General Tire & Rubber Company, is recovering at City Hospital, Akron, O., from an operation for an abscessed appendix on August 28. Mr. Fouse was one of the founders of the General Company in 1915, but as far back as 1908 he was a partner of W. F. O'NEIL, president of General, in founding a tire distribution concern at Kansas City, Kan.

A. S. KEEFER, formerly manager of the Cincinnati branch of the Miller Rubber Products Company, has been appointed a district manager to supervise sales in the Akron, Columbus and Cincinnati territory. His headquarters will be at Akron.

M. J. MISCOE has been appointed service manager of the United Tire Stores Corporation of America, with headquarters at Akron, O. He has had 18 years of experience in the designing, manufacturing and management branches of the tire industry.

JOSEPH ANDREOLI, export manager of the India Tire & Rubber Company, is expected back at Akron in a few days from a short business trip to Europe. He left early last month on the S. S. Leviathan.

H. W. LOVE has been named by the Miller Rubber Products Company as field manager in the San Francisco territory. He has had wide experience in the Pacific Coast tire trade.

H. CLAYTON-WRIGHT, well known in the British auto accessory trade, has resigned from the board of Desmo, Ltd., Birmingham, and joined Perrite, Ltd., Weldbank Rubber Mills, Chorley Lanes, as managing director.

WILLIAM M. MCCONNELL, pilot of the Firestone Tire & Rubber Company plane, took four Cleveland society women aloft this month for an aerial game of bridge.

CATALPO
for
Treads

Rubber News Around the World

DUNLOP RUBBER EXPLAINS MACINTOSH CABLE SALE

The shares of the Dunlop Rubber Company, Ltd., recently suffered a substantial fall on the London Stock Exchange and have shown little tendency to recover. This movement is attributed to the disposal of a unit of the Macintosh group of rubber manufacturing companies, but as this is a relatively unimportant subsidiary interest, the explanation appears more likely to be found in the continued depression of the commodity. The depreciation during the past year must have a material influence on the value of trading stocks of such a large user as the Dunlop undertaking, although this firm of course, is more favorably placed than many such concerns since it grows a large proportion of its own rubber through its subsidiary, Dunlop Plantations, Ltd.

The company has issued the following statement regarding the MacIntosh transaction: "When the Dunlop Rubber Company in 1926 took over the Macintosh group of companies with which Lord Colwyn was associated, it required as a part of the general deal an interest in the Macintosh Cable Company. The business of this company proved quite a satisfactory one, but it embraced both electric and cable manufacture and electrical constructional engineering, branches of activity which under modern developments are becoming increasingly removed from the normal scope of a rubber manufacturer. We are authorized to state that the Dunlop Company has disposed of its interests in the cable company on terms which the board consider favorable. As a result premises will be released which are required for the expanding business of the Dunlop Rubber Company."

Michelin to Make Mechanicals

Michelin & Compagnie, leading French rubber manufacturer, is reported as having finally broken away from confining itself strictly to tire production. A line of inflatable toys has been added to the output of its factory at Clermont-Farrand and is planning to produce mechanical goods, such as rubber hose and belting.

CATALPO
for
Frictions

Frederick Kaye

Frederick Kaye, inventor of rubber latex paper and a well known rubber technologist, died last month at his home in Ashton-on-Mersey, England. He was 64 years of age.

Mr. Kaye at one time held an appointment at the Manchester College of Technology. From 1913 to 1917 he was on the staff of the Northern Polytechnic Institute, Holoway, London. He also traveled extensively, visiting Mexico and Uganda to investigate rubber projects, and wrote many important articles on the technology of rubber and rubber latex.

German Tire Exports

During the first half of 1930 Germany exported 155,485 automobile casings, as compared to 134,796 in the first half of 1929. Inner tubes exported from Germany during the first half of 1930 amounted to 129,091, as compared to 121,876 in the same period of 1929. Germany exported 3,642 solid tires during the first half of 1930, as compared to 5,862 in the same period of 1929.

British Tire Exports Jump

Exports of automobile casings from United Kingdom to foreign countries during the first six months of 1930 numbered 756,489, a sharp increase compared with the figures for the same period of 1929 which showed 550,598 casings exported. British India, Italy, British South Africa, France, Irish Free State, Netherlands, Argentina and New Zealand were the leading markets during the first half of 1930 in the orrer named.

TAN KAH KEE TO EXPAND IN EUROPEAN MARKETS

It is reported by sources considered reliable that Tan Kah Kee & Company, large Singapore manufacturer of rubber goods, and particularly of canvas rubber-soled shoes, is planning to expand its selling activities abroad. This firm markets its products throughout Asia, commonly through retail sales branches, and a large distribution of its products has been obtained by this means.

Retail sales branches are to be opened in the Netherlands, Germany, France, Belgium, Spain, and Italy, and a sales campaign is being begun through the London agents to secure a share of the British market, according to the local press.

The Singapore factory anticipates an increased output next year from its present daily average of 10,000 pairs of shoes to 15,000 pairs. It is stated that the potential capacity of the Singapore factory is between 20,000 and 30,000 pairs of shoes daily.

If Tan Kah Kee is successful in operating in the European rubber footwear market, it is reported that the company will attempt expansion in South America.

MICHELIN AND PIRELLI RUSH ARGENTINE PLANTS

Following a recent announcement that the Goodyear Tire and Rubber Company is to construct a large factory, with a daily output of 1,000 tires and inner tubes, in the Hurlingham district of Buenos Aires, it has been stated that the French Michelin Company is to open a similar plant in the neighbouring vicinity of of Bella Vista, while the Italian Pirelli Company, which has operated an establishment in Buenos Aires for some years is engaged on the building of much larger premises than those it owns at present in Nueva Chicago.

The Michelin Company has purchased a site of approximately 20 hectares adjoining the Buenos Aires and Pacific Railway line at Bella Vista, and about 300 metres distant from the Rio Las Conchas. It is proposed to transport the rubber, in its rough state, from Indo-China, where the company has its own plantations. The cotton required for the manufacture of tires will be imported from Egypt, but it is within the bounds of possibility that the company will purchase land in Chaco and cultivate its own cotton there.

The Pirelli Company had had a rubber-goods plant in operation in Flores for many years past. The plant has, however, been devoted almost entirely to the manufacture of rubber-insulated cables and similar products. When the new factory is completed it will produce pneumatic tires on a competitive scale.

It is also believed that the Goodrich and the Continental Rubber companies will open factories shortly in the Argentine Republic. The former concern has already had engineers in Buenos Aires to study the lay-out of a plant. The local manager for the Cia. La Continental has also stated that his firm is engaged on the selection of a suitable site for a plant.

BATA OF CZECHOSLOVAKIA WILL SELL AUTO TIRES

The firm of T. & A. Bata, of Czecho Slovakia, which not only manufactures shoes but has 1,000 retail stores, will begin the manufacture of a low-priced automobile tire which will be distributed through the shoe outlets, according to information received by the Department of Commerce within recent weeks.

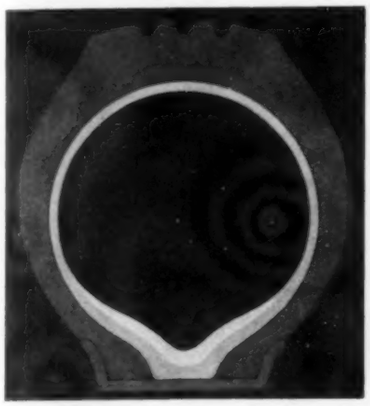
The Bata shoe company also operates a number of retail shoe stores in the United States. There is no intention of distributing tires through these stores, one of the company's representatives at New York has stated.

Original reports were that the company would also manufacture an inexpensive automobile, but this has been denied. The tires will be sold for cash only.

Rubber Goods and Specialties

Nonpareil Kant-Pinch Tube

Under the name of the Nonpareil Kant-Pinch inner tube, the Pennsylvania Rubber Company, Jeannette, Pa., has announced a new automobile tube that can not be pinched and requires no flap. Regardless of the type of rim used, no flap is required, even when the rim is of the drop-centre or semi-drop

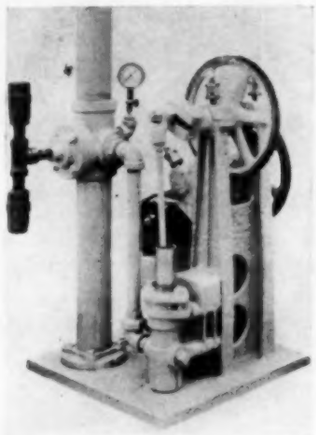


centre construction. At the point of contact with the rim, the Nonpareil tube has a tremendous but balanced reenforcement of two entirely different kinds of rubber, according to the manufacturer. Its construction is such that the rubber can not be "sawed" or creep between rim and bead. Sidewalls are more than twice the thickness of the average heavy tube, and because it holds air better and longer it preserves the tire from premature wear such as is frequently due to underinflation.

Packard Port-O-Lites

These heavy duty portable extension lights for garage and shop use are constructed of 25 feet of Packard Flex-O-Cord which has been developed especially for extreme flexibility, toughness and long life. An unbreak-

able and interchangeable rubber attachment plug is provided on one end. Special strain reliefs are furnished both at the socket and the attachment plug end. They are manufactured by the Packard Electric Company, Warren, Ohio.



Hydro-Acid Pump

This hydro-acid pump, developed by the Paige & Jones Chemical Company, Inc., Hammond, Ind., handles any acid in concentrations not injurious to rubber. Hard rubber nipples, hard rubber check valves, a hard rubber tee, a hard rubber elbow and a gum rubber sack are features of its construction. Hanging in the center of the cylinder shown in the illustration is the gum rubber sack which is attached by hard rubber piping to hard rubber fittings and check valves. Acid is sucked into the sack upon the upstroke of the plunger and discharged upon the downstroke. The standard machine is available in three maximum capacities, and special pumps may be built to handle greater pressures.

Fulton Accelerator Pedal

The Fulton Company, Milwaukee, Wis., is now offering a new type of accelerator pedal for automobiles. Made of duralumin with a heavy rubber pad inserted to add to comfort and protect the foot from engine heat, the pedal is 10 inches long, 2½ inches wide, and is natural foot shape, curved to fit the shoe sole. A feature is the ball bearing attachment which fits on any accelerator button and makes the operation of the pedal smooth. Another feature is the spring catch at the heel which permits removing the pedal without taking out any nuts or bolts if it is necessary to lift the floor board.

Rebuilt Auto Tires

Auto Tyre Services, Ltd., Worting, England, is developing a considerable business with its A. T. S. Cord tire, which is built up on the existing carcass of a used casing. The motorist may either have his own tire retreaded or may trade it for a casing that has already been rebuilt. This company strips the old tread off thoroughly, tests the carcass carefully, and then rebuilds the casing in its own molds. The A. T. S. cord is guaranteed by the manufacturers for 8,000 miles.

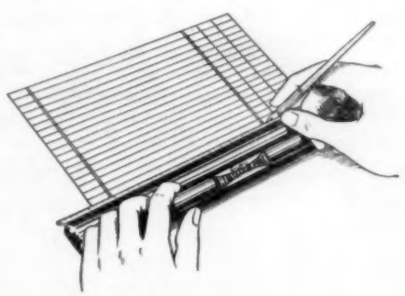
"Pinch-Proof" Base Tube

Designed especially for Ford cars, this "Pinch-Proof" Base moulded tube is being offered by the Cupples Company, St. Louis. It is intended to eliminate the possibility of tube pinches caused by rocking beads due to under-inflation or the improper seating of beads, said to be particularly frequent on

drop centre wire wheels. These tubes are manufactured from pure rubber, containing no reclaim, and are full size, moulded to fit the tire. They contain an extra reinforcement of rubber at the base, where such protection is needed on drop centre wire wheels. The manufacturer claims high tensile strength and resistance to tear for these tubes and offers to replace free of charge any tube that should pinch in a drop centre wire wheel.

Graffco Hi-Speed Ruler

To affect an appreciable saving in time and a general increase in efficiency, the George B. Graff Company, 54 Washburn avenue, Cambridge, Mass., has developed this Graffco Hi-Speed ruler, which is featured by rubber covered rollers turning on ball bearings. According to the manufacturer, it



permits horizontal ruling in half the usual time, perpendicular ruling without shifting the position of the ruler, and ink ruling without blotting. The steel shell gives weight to the ruler, the rubber rollers make it non-slipping, and the groove in the top of the ruler can hold a pencil or pen. It is made in 12-inch, 15-inch and 18-inch sizes.

Current Crude Rubber Items

GROWERS GROUP TO MEET WITH STRAITS GOVERNOR

A meeting of Malayan rubber producers held at Kuala Lumpur, August 21, adopted the resolution passed by the Asiatic Planters' Association of Malaya on July 20, recommending curtailment of production, and appointed a committee to confer with the governor of the Straits Settlements.

The planters' resolution referred to, provided that the government be asked to legislate for rubber restriction by periodical stoppage of tapping or the reintroduction of the Stevenson scheme in a modified form, such legislation being provisional upon equivalent action by the Dutch East Indies and Ceylon.

The planters further recommended that the government, in conjunction with the Dutch East Indies government and Ceylon, should not alienate land for rubber growing for a period of years.

A meeting of Chinese rubber estate owners and merchants at Jahore approved the same resolution last month.

Wages Drop in S. S.

Following representations made by rubber planters in Wellesley Province, Straits Settlements, the standard rates of wages of Indian male and female labor have been reduced from 50 and 40 cents respectively to 40 and 32 cents daily. Similar reductions are being made in the Federated Malay States. The wage cut is directly attributable to the fall in the price of crude rubber.

Production of crude rubber on estates of more than 100 acres in the Far East in July totaled 22,704 tons, as against 20,295 tons in June.

Rubber Exchange Differentials

The adjustment committee of the Rubber Exchange of New York has established differentials between the various grades of hevea plantation rubber to prevail on all deliveries against Exchange contracts during September. The differentials follow: Off quality first latex crepe, 0.02 cents per pound; good f. a. q. ribbed smoked sheets, 0.05 cents per pound; ordinary f. a . q. ribbed smoked sheets, 1 cent per pound.

HALF-YEAR CONSUMPTION DECLINED 65,500 TONS

That the falling off in consumption rather than any increase in production has been chiefly responsible for the changes occurring in the statistical position of crude rubber is shown by an estimate of shipments and absorption for the first six months of 1930 as compared with the first half of 1929. The table, compiled by a leading Mincing Lane firm and amended to conform with the Rubber Manufacturers' Association quarterly reports, follows:

	1930 (Tons)	1929 (Tons)
Shipments—		
Malaya	215,000	218,000
Ceylon	36 000	38,000
Dutch East Indies	125 000	132,000
Other Eastern plantations	22 000	23,000
Brazil and wild	11,500	14,000
	409 500	425,000
Consumption—		
United States	216,000	268,000
United Kingdom	32,500	31,500
Other countries	125,000	140,500
	374,500	440,000

RESTRICTION AGITATION PROGRESSES IN THE EAST

That the current agitation by rubber growing interests for a renewal of restriction is making headway among producers' organizations is shown by the following summary of advices received by the Rubber Growers' Association, Inc., from Malaya and Ceylon:

"Malaya: The local secretary of the Rubber Growers' Association has notified that the Planters' Association of Malaya and other public bodies support the Anglo-Dutch Liaison Committee conclusions and that the deputation representing property planters and all interests have interviewed the governor of the Straits Settlement, who will discuss the rubber situation with the governor general of the Dutch East Indies when he visits that country toward the end of this month.

"Ceylon: The following bodies have notified their support of the Anglo-Dutch Liaison Committee conclusions: Ceylon Estate Proprietary Association, Planters' Association of Ceylon, Low Country Producers' Association.

"The chairman of Ceylon Estates Proprietary Association has advised that a deputation representative of local bodies interviewed the governor, who agreed with the unanimous view of the deputation that the industry in Ceylon was faced with grave consequences unless some form of universal restriction was introduced at an early date.

"The local government agreed to cable to the British Government informing them that they were prepared to assist with any legislation which may be necessary to carry out a restriction scheme.

"The deputation was formed into a committee with the senior government serving as chairman to consider various schemes and generally watch the future trend of events."

Malayan rubber shipments for the month of August amounted to 47,802 tons, an increase of 6,455 tons over the 41,347 tons shipped during the previous month, according to cables received by the Rubber Exchange of New York.

Closing Prices on Rubber Exchange of New York, Inc.

FROM AUGUST 20 TO SEPTEMBER 3, 1930

		Spot	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sales
No. 1 Standard Contract of 10 Tons															
Aug.	20	9.75	9.77	9.91	10.06	10.22	10.36	10.49	10.62	10.71	10.81	10.99	11.17	——	20
	21	9.90	9.95	10.11	10.27	10.45	10.57	10.68	10.79	10.89	10.98	11.16	11.32	——	42
	22	9.75	9.65	9.81	9.97	10.12	10.25	10 37	10.50	10.60	10.71	10.90	11.10	——	59
	23	9.95	9.72	9.92	10.11	10.30	10.44	10.57	10.71	10.83	10.95	11.10	11.25	——	51
	25	9.81	9.83	9.97	10.11	10.25	10.39	10.52	10.65	10.79	10.93	11.12	11.30	——	29
	26	9.81	9.70	9.84	9.98	10.12	10.27	10.41	10.55	10.67	10.80	10.97	11.14	——	32
	27	9.81	9.70	9.84	9.97	10.10	10.26	10.41	10.56	10.68	10.81	10.96	11.11	——	73
	28	9.75	9.69	9.80	9.90	10.00	10.14	10.28	10.42	10.55	10.67	10.85	11.04	——	75
	29	9.75	9.64	9.74	9.87	10.04	10.18	10.31	10.44	10.54	10.64	10.75	10.90	——	21
Sept.	2	9.56	9.50	9.62	9.73	9.85	9.98	10.10	10.22	10.34	10.45	10.62	10.79	10.95	31
	3	9.25	9.20	9.30	9.40	9.50	9.64	9.77	9.90	10.01	10.12	10.25	10.38	10.50	82
"A" Contract of 2½ Tons															
Aug.	20	——	9.60	9.80	9.90	10.10	10.30	10.40	10.50	10.60	10.80	10.90	11.10	——	217
	21	——	9.80	10.00	10.10	10.20	10.40	10.50	10.70	10.80	10.90	11.00	11.20	——	239
	22	——	9.60	9.80	9.90	10.00	10.20	10.30	10.40	10.50	10.60	10.80	11.00	——	489
	23	——	9.60	9.80	10.00	10.20	10.40	10.50	10.60	10.70	10.80	10.90	11.10	——	43
	25	——	9.60	9.80	9.90	10.10	10.30	10.40	10.50	10.60	10.80	10.90	11.10	——	172
	26	——	9.60	9.80	9.90	10.10	10.20	10.30	10.40	10.60	10.80	10.90	11.00	——	172
	27	——	9.60	9.70	9.80	10.00	10.20	10.30	10.40	10.50	10.70	10.80	11.00	——	136
	28	——	9.60	9.60	9.70	9.90	10.10	10.20	10.30	10.40	10.60	10.70	10.90	——	185
	29	——	9.50	9.50	9.70	9.90	10.10	10.20	10.30	10.40	10.50	10.60	10.80	——	108
Sept.	2	——	9.40	9.50	9.60	9.70	9.90	10.00	10.20	10.30	10.40	10.50	10.70	10.90	231
	3	——	9.10	9.20	9.30	9.40	9.50	9.60	9.80	9.90	10.00	10.10	10.20	10.40	350

CATALPO
for
Mechanicals

"MASS FEEDING" IN U. S. DETROIT RUBBER PLANT

A novel plan of "mass feeding" of factory workmen, in the interest of time-economy, now appears as a complement to the mass production methods practiced in modern manufacturing establishments.

At the tire plant of the United States Rubber Company, at Detroit, thousands of workers are fed in the space of a few minutes by means of unique portable metal kitchens, by which food is brought to the workman instead of the workman having to go after his food. The innovation has been warmly received by the employees on piece work, to whom a saving in time means money, and to those other workers who prefer their food brought to them rather than to have to resort to the plant restaurant or cafeteria or go outside for their noon meals. The plan also means a longer interval of recreation between the noon meal and the afternoon starting whistle.

The portable kitchens are loaded with food at a central loading station, and at a given signal just before the noon whistle, dash out for different quarters of the plant.

Electric heating elements in each wagon, with a wall plug attachment, keep hot foods heated, and ice compartments maintain milk and similar items frigid until called for. By reason of the new system the thousands of workers all may be fed in the space of a few minutes.

So successful has the new system worked at the United States tire plant that the concessionaires, Riddell and Mulloy, expect to extend their operations to several of the large automobile factories in the Detroit area.

Goodyear Outing at Gadsden

Employes of the Goodyear Tire & Rubber Company plant at Gadsden, Ala., enjoyed their first annual outing last month at East Lake Park, Birmingham, Ala. A baseball game was a feature of a program that included all varieties of athletic and other entertainment.

General to Make New Tube

The General Tire & Rubber Company is planning the manufacturer of a new compression type inner tube, which is said to have been in the course of development for three years. C. J. Durban, formerly in charge of sales and advertising for the Polson Rubber Company, Garrettsville, O., will direct the new compression type tube department for General.

Dill Handbook Issued

The Dill 1930 Handbook has recently been published by the Dill Manufacturing Company, Cleveland, O., and is being distributed to tire dealers. It is a complete and up-to-date manual of tire valves, valve parts and accessories, and is copiously illustrated.

The Standard Underground Cable Company, Perth Amboy, N. J., has let a contract for the construction of two buildings to be used for a rubber manufacturing plant.

Firestone Resumes Work

Employees of the Firestone Tire and Rubber Company, Akron, O., returned to work August 25, after a week's layoff for all departments. Work was resumed on an increased schedule.

New Seiberling Booklet

The Seiberling Rubber Company, Barberton, O., has added to its sales promotion literature a new booklet entitled, "Catty Yet Chatty." Illustrated with cartoons, it describes the problems of the tire dealer and his relationship with the tire manufacturer.

Goodyear Test Car Stolen

One of the test cars of the Goodyear Tire and Rubber Company, driven by Harry Apple, was stolen August 8 by three bandits, 15 miles west of Marion, O. It was recovered near Melba, O., the next day. The bandits bound and gagged Apple and left him in their car, driving away themselves with the Goodyear car. It is believed by police authorities that the bandits were the same men who killed a proprietor of a cafe in Marion a short time after the theft of the car.

GOODRICH EXPANDS RETAIL STORES ON PACIFIC COAST

Four new stores will be added this month to the Pacific Coast chain of Goodrich Silvertown Incorporated, bringing the total of the west coast group to 42. New stores will be opened during the month at Los Angeles, Seattle, Tacoma and Sacramento.

The Pacific Coast group, operating as the retail division of Pacific Goodrich Rubber Company ($4,000,000 Los Angeles Plant) began operations less than 20 months ago. Its first store was established October 31, 1928, in Los Angeles. The territory served by Pacific Goodrich comprises the eleven western states from Canada to Mexico and from Colorado to the Pacific Ocean.

The Pacific division of Goodrich Silvertown Incorporated was organized by S. B. Robertson, vice-president and general manager of Pacific Goodrich Rubber Company, F. E. Titus, general salesmanager and other executives of the Pacific Goodrich Company.

Consulting Rubber Technologist

PRACTICAL

Twenty years' experience with the largest and most successful companies in the country

Physical and Chemical Testing
Special facilities for abrasion and quick age tests

Expert Advice to Correct Factory Trouble

New Processes and Formulas Developed

R. R. Olin Laboratories
P. O. Box 372, AKRON, OHIO
Telephones: Barberton 828, Portage 5895W

O'Neil Home Robbed

Burglars entered the home of William O'Neil, president of General Tire & Rubber Company, 1290 W. Exchange Street, Akron, on the evening of August 11, and got away with jewelry valued at about $4,000. The prowlers entered the house by means of a ladder placed underneath the window of a small sitting room adjacent to a bed chamber where Mr. and Mrs. O'Neil were sleeping at the time.

CLASSIFIED ADVERTISING

Five cents a word, minimum charge $2.00, payable in advance.
Address replies to Box Numbers
THE RUBBER AGE
250 West 57th St., New York City

HELP WANTED

WANTED—Representative in New England Territory for a small Ohio Rubber Factory to sell on commission. This company has been in business over 12 years, and is financially sound. They make hard and soft rubber parts for a number of nationally known manufacturers. No objections to representative selling non-conflicting lines. Give age, experience and references. Address: Ohio Rubber Manufacturer, Box 569, THE RUBBER AGE.

SALES ENGINEER

WANTED—A man thoroughly acquainted with the Hydraulic Press field for the molding of rubber, Bakelite, Durez, celluloid and other plastic materials. Give age, references and salary expected, also your experience in detail. Good opportunity for the right man. Address Box 567, THE RUBBER AGE.

WANTED—a man to sell compounding materials between New York and Philadelphia and adjacent territory. Must have technical training and rubber experience. Address Box 568, THE RUBBER AGE.

SALESMAN WANTED — Southern territory. Rubber Belting and General Mechanical Rubber Line. Must be well-known to the trade and have years of experience in this line. Replies will be treated in confidence. Address Box 566, THE RUBBER AGE.

BUSINESS OPPORTUNITIES

SHOWER CURTAINS—I can assist any rubber manufacturer who has rubberizing facilities to profitably enter the shower curtain field. I have considerable experience and knowledge of production and marketing this product with an excellent following among large purchasers. This is an expanding field worth cultivating. Can assure a large volume of business. Address Box 570, THE RUBBER AGE.

LATE MARKET PRICES

RUBBER—COTTONS AND FABRICS—CHEMICALS

NEW YORK, SEPTEMBER 4, 1930

RUBBER

Crude

FOR two weeks it appeared that if crude rubber was not on the upward trend in price, at least would sink no further than the low point of August 19. On September 3 and 4, however, the market sagged again, bringing the price on the New York outside market down to a new bottom of 9⅜ cents a pound. At the same time, the September delivery on the New York Rubber Exchange fell to an even 9 cents, and the London market broke to 4½ pence.

While stocks of the crude commodity are increasing, it is evident that American tire factories are cutting their inventories down to a point where much heavier production will be necessary. The July tire statistics of the Rubber Manufacturers Association will show production in that month at the lowest level for the year, with shipments the highest, and a consequent reduction of stocks of casings below even the January 31 figure of 12,719,000. August tire factory operations were on approximately the same level, and September thus far has shown no improvement.

Prices quoted on the New York outside market on September 4 were as follows:

Plantations—

Ribbed Smoked Sheets—		
Spot-Sept.	.09⅜@	.09½
October	.09¼@	.09⅜
Nov.-Jan.	.09⅜@	.09⅝
First Latex, crepe spot	.09¼@	.09⅜
Amber Crepe, No. 2	.08⅝@	.08⅞
Amber Crepe, No. 3	.08⅜@	.08⅝
Amber Crepe, No. 4	.07⅞@	.08⅛
Brown Crepe, Clean thin	.08¼@	.08½
Brown Crepe, specky	.08 @	.08¼
Liquid Latex, per gal.	.75 @	.85

Paras

Up-river Fine	.18 @	.18¼
Up-river Medium	Nominal	
Up-river Coarse	.06½@	—
Acre Bolivian, fine	.13¼@	.13½
Caucho Ball, Upper	.06 @	—
Islands, fine	Nominal	

Centrals—

Central, scrap	.06½@	.06¾
Esmeraldas	.06½@	.06¾

Balata—

Block, Colombia	Nominal	
Block, Ciudad	.41 @	.42

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers

Spot-September	4½d@	—
October	4⅝d@	—
October-December	4⅝d@	4¾d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers

Spot	4⅛d@	—

Scrap

Prices in the scrap rubber market have softened in sympathy with the slump in the quotations for the crude commodity. Collections have been curtailed to a great extent, although some dealers are stocking up in anticipation of higher fall and winter prices and an increase in the use of reclaim. Late quotations are as follows:

(Prices to Consumer)

Auto tire peelings	ton	23.00	@25.00
Standard White auto	ton	40.00	@42.50
Mixed auto	ton	13.50	@14.00
Bicycle tires	ton	13.00	@15.00
Clean solid truck tires	ton	24.50	@25.00
Boots and shoes	cwt.	1.10	@ 1.15
Arctics, untrimmed	cwt.	.70	@ .80
Inner tubes, No. 1	lb.	.06½	@ .06⅝
Inner tubes, No. 2, compounded	lb.	.02½	@ .02¾
Inner Tubes, Red		.02¾	@ .02⅞
Air Brake Hose	ton	14.00	@16.00
Rubber Hose	ton	12.00	@13.00

Reclaimed

Rubber reclaimers are holding their production down to a minimum in accordance with the decline in demand for their product. Demand is expected to improve substantially in the early autumn, but reclaimers are not making any effort to increase their stocks further at the present time. The latest price quotations for the different grades of reclaim are as follows:

High Tensile

Super-Reclaim Black	lb.	.09¼@	.09½
High Tensile Red	lb.	.09 @	.09¼

Shoe

Unwashed	lb.	.06½@	.06¾
Washed	lb.	.08½@	.08¾

Tube

No. 1 (Floating)	lb.	.09¾@	.10
No. 2 (Compounded)	lb.	.08¼@	.08½

Tires

Black	lb.	.06¼@	.06½
Black, selected tires	lb.	.06½@	.06¾
Dark Gray	lb.	.07¾@	.08
Light Gray	lb.	.08½@	.08¾
White	lb	.09¾@	.10
Truck, Heavy Gravity	lb.	.06¼@	.06½
Truck, Light Gravity	lb.	.06½@	.07

Miscellaneous

Mechanical blends	lb.	.05 @	.05½

COTTON and FABRICS

Cotton

SINCE touching its low point of 11 cents a pound on August 18, the price quotation for spot middling upland cotton has been consistently steadier and higher. The close on September 4 was 11.45 cents, with the market nervous due to the possibility of the Santo Domingo hurricane touching the lower part of the cotton belt.

World cotton textile trade conditions continue to be generally unsatisfactory, but more buying interest is reported on the part of Japan and Europe.

The high, low, and closing prices on the New York Cotton Exchange on September 4 were as follows:

	High	Low Sept. 4	Close	Close Aug. 20
Oct.*	11.28	11.07	11.17	11.06
Dec.*	11.46	11.25	11.36	11.24
Jan.*	11.52	11.38	11.46	11.35

Tire Fabrics

Tire fabrics have held steadier with the rise in the price quotations for raw cotton, but demand still remains light and sales are far below the level of last summer. A substantial pick-up in October and November is expected. Latest price quotations for the various grades of tire fabric follow:

CORD

Peeler, carded, 28/5/3	lb.	.37½@	.38
Peeler, carded, 28/4/3	lb.	.39½@	.40
Peeler, carded, 13/3/3	lb.	.35 @	.35½
Peeler, carded, 15/2/3	lb.	.35½@	.36
Egyptian, carded, 28/5/3	lb.	.48¼@	.48¾
Egyptian, combed, 28/5/3	lb.	.54 @	.55¾

CHAFERS

Carded, American, 8 oz.	lb.	.33 @	.34
Carded, American, 10 oz.	lb.	.32½@	.33
Carded, American, 12 oz.	lb.	.31 @	.32
Carded, American, 14 oz.	lb.	.30 @	.31

LENO BREAKER

Carded, American, 8¾ oz.	lb.	.34 @	.37½
Carded, American, 10¼ oz.	lb.	.34 @	.37½

SQUARE WOVEN

Carded, American, 17¼ oz. 23-11 ply	lb.	.38 @	.38½
Carded, American, 17¼ oz. 10-ply	lb.	.30½@	.31½

Sheetings

The sheetings market closed fractionally lower than at the end of the previous fortnight. Late quotations, as reported by the Textile Brokers Association, follow:

40-inch, 2.50-yard	yd.	.08⅝@	.08¾
40-inch, 2.85-yard	yd.	.07½@	.07⅝
40-inch, 3.15-yard	yd.	— @	.09
40-inch, 3.60-yard	yd.	— @	.07½
40-inch, 3.75-yard	yd.	— @	.06¼
40-inch, 4.25-yard	yd.	— @	.06¼

Ducks

There was a decline of between a half-cent and a cent a pound in hose and belting ducks during the fortnight, bringing that grade in line with the lower prices for other cotton ducks. Current price quotations are as follows:

Belting and Hose	lb.	.29 @	.30
Enameling	lb.	.28 @	.31
Single filling	lb.	.13¾@	.13½
Double filling	lb.	.14 @	.15

CHEMICALS

WITH inventories in the tire industry brought down to as low a point as possible early this fall, rubber manufacturers will have to increase their factory production schedules over the low rates that have prevailed during July and August. Some plants are already beginning to place their orders for a sufficient supply of rubber chemicals and compounding materials to enable them to enter upon heavier production. Meanwhile, the past two months have been the poorest since the end of 1929 as regards the sale and consumption of chemical supplies in rubber plants. The price structure, however, has remained unchanged with but few exceptions.

ACCELERATORS

Organic

A-1	lb.	.24 @	.27
A-5-10	lb.	.33 @	.36
A-7	lb.	.55 @	.59
A-11	lb.	.62 @	.66
A-16	lb.	.57 @	.61
A-19	lb.	.58 @	.62
A-20	lb.	.64 @	.68
A-32	lb.	.90 @	.95
Aldehyde ammonia, crystals	lb.	.65 @	.70
Aniline oil, drums, f.o.b. works	lb.	.15 @	.16
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.42 @	.44½
Diphenylguanidine	lb.	.30 @	.32½
Dipsol	lb.	4.30 @	4.50
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½@	.40
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.58½@	.61
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.37½@	.40
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.75 @	—
R & H 40	lb.	.40 @	.42½
R & H 50	lb.	.40 @	.42½
R & H 397	lb.	.75 @	.77½
R-2	lb.	1.95 @	2.15
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Tensilac, No. 39	lb.	.40 @	.42½
Tensilac, No. 41	lb.	.50 @	.52½
Thermlo F	lb.	.50 @	.55
Thiocarbanilid, drums	lb.	.25½@	.28½
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.62½
Tuads	lb.		
Ureka	lb.	.75 @	1.00
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z 88	lb.	.50 @	.60
Zimate	lb.		

Inorganic

Lead, sublimed blue	lb.	.08¼@	—
Lead, white	lb.	.08½@	.08¾
Litharge, domestic	lb.	.07¾@	—
Magnesia, calcined, light	per 100 lb.	5.35 @	5.45
heavy	per 100 lb.	3.65 @	3.75

COLORS

Blacks (See Compounding Materials)

Blues

Prussian	lb.	.35 @	.36
Ultramarine	lb.	.06 @	.32

Browns

Sienna, Italian	lb.	.05½@	.12½
Umber, Turkey	lb.	.04½@	.07

Greens

Chrome, light	lb.	.30 @	.32
medium	lb.	.31 @	.33
dark	lb.	.34 @	.36
Chromium Oxide, bbl.	lb	34½@	.35½

Reds

Antimony crimson, 15/17	lb.	.40 @	.44
sulfur, free	lb.	.56 @	.66
golden 15/17 F.S.	lb.	.20 @	.25
Indian English	lb.	.08 @	.11
Domestic (Maroon)	lb.	.11 @	—
Oximony	lb.	.13¼@	—
Red oxide, pure	lb.	.10 @	.12
Smith's 444 Crimson f.o.b. Springfield	lb.	.08¾@	.10
Rub-Er-Red, f.o.b. Easton	lb.	.08¾@	—
Venetian red	lb.	.03 @	.06
Vermillion, quicksilver, English	lb.	1.75 @	1.80

Whites

Lithopone, Akcolith	lb.	.05 3/5@	.06
Lithopone, Albalith	lb.	.05¼@	.05¾
Lithopone, Azolith	lb.	.05¼@	.05¾
Lithopone, Vanolith	lb.	.05¾@	—
Titanox B, f.o.b. St. Louis,	lb.	.07¼@	.07¾
Titanox C, f.o.b. St. Louis,	lb.	.07¾@	.08¼

Zinc Oxide—American Process

American Azo:			
ZZZ (lead free)	lb.	.06½@	.07
ZZ (leaded)	lb.	.06⅝@	.06⅞
Horsehead Brand:			
Special	lb.	.07 @	.07½
XX Green	lb.	.07 @	.07½
XX Red, lead free	lb.	.06½@	.07
Kadox, black label	lb.	.10⅝@	.10⅞
blue label	lb.	.09⅝@	.09⅞
red label	lb.	.08 @	.08½

Zinc Oxide—French Process

White seal	lb.	.11⅝@	.11⅞
Green seal	lb.	.10⅝@	.10⅞
Red seal	lb.	.09⅝@	.09⅞

Yellows

Chrome	lb.	.17 @	.17½
Ocher, French medium	lb.	.02 @	.03
domestic	lb.	.01⅝@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Ammonia carbonate, lump	lb.	.07½@	.07¾
Asbestine	ton	14.75 @	18.00
Barium carbonate	lb.	.03½@	.05
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	12.00 @	18.00
Western prime white	ton	23.00 @	—
imported	ton	27.00 @	36.00
Basofor	lb.	.04½@	—

Blacks

Arrow "Aerfloted"	lb.	.05 @	.10
Bone Black	lb.	.06 @	.12½
Carbon, compressed	lb.	.04½@	.09
Carbon, uncompressed	lb.	.04½@	.09
Disperso, f.o.b. Louisiana	lb.	.046 @	—
Disperso, f.o.b. Texas	lb.	.04½@	—
Drop Black	lb.	.06 @	.14
Fumonex	lb.	.04 @	.08
Excello, compressed	lb.	.05 @	.09
Gastex, f.o.b. Texas	lb.	.04 @	.05¼
Lamp Black	lb.	.10 @	.40
Micronex	lb.	.05 @	.10
Thermatomic-Thermax	lb.		
Flex	lb.		
P-33	lb.		
United carbon, fob Tex.	lb.	.04½@	.09½
Velvetex carbon	lb.	.03 @	.06
Blanc fixe dry f.o.b. works	ton	80.00 @	90.00
Carrara filler	lb.	.01¾@	.02
Catalpo (fact.)	lb.	.02 @	—
Clay, China, domestic	ton	8.00 @	9.00
Aerfloted, Suprex	ton	10.00 @	22.00
Congaree, c. l. f.o.b. mine	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Langford	ton		
Lexington	ton	10.00 @	22.00
Mineral Flour, c.l. f.o.b. mine	ton	20.00 @	23.00
Par	ton		
Tensulite		15.00 @	—
Glues, extra white	lb.	.22 @	.26
medium white	lb.	.20 @	.24
Magnesia, carbonate	lb.	.08¾@	.11
Mica, white water grnd.	lb.	.06 @	.08
Off color (biotite)	lb.	.05 @	.07
Rotten Stone (powdered)	lb.	.02 @	.05
Soapstone, powdered	ton	15.00 @	22.00
Starch, powdered	cwt.	3.62 @	3.92
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	cwt.	— @	1.00
English cliffstone	cwt.	1.75 @	2.00
Quaker	ton		
Superfine	ton	10.00 @	12.00
Sussex	ton		
Witco	ton	20.00 @	—
Zinc Carbonate	lb.	.09½@	.10½
Zinc Stearate	lb.	.23 @	.24½

MINERAL RUBBER

Genasco (factory)	ton	50.00 @	52.00
Granulated M. R.	ton		
Hard Hydrocarbon	ton		
Paradura	ton	62.50 @	65.00
Parmr, solid	ton	28.00 @	48.00
Pioneer, MR, solid	ton	40.00 @	42.00
Pioneer-granulated	ton	50.00 @	52.00
R & H Hydro-Carbon	ton	27.05 @	29.00
Robertson, MR, solid	ton	34.00 @	80.00
M.R. (gran)	ton	38.00 @	80.00

SOFTENERS

Acids

Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66°	cwt.	1.60 @	1.95
Tartaric, crystals	lb.	.35 @	.36

Acids, Fatty

Laurex	lb.	.15 @	.16
Stearex	lb.	.13 @	.17
Stearic, double pressed	lb.	.17 @	.22

Alkalies

Caustic soda, 76%	cwt.	3.76 @	3.91
Soda ash, 58% C.L.	cwt.	1.40 @	

Oils

Corn, refined, bbls.	lb.	.08 @	.09¾
Cottonseed, crude		.07 @	.07¾
Cycline	gal.	.27 @	.34
Degras (c.l. 100 bbls.)	lb.	.03¾@	—
Less c.l. (10-25 bbls.)	lb.	.04 @	—
Lots less than 10 bbls.	lb.	.04¼@	.04½
Fluxrite	lb.	.05½@	.06¼
Palm Lagos	lb.	— @	.07
Niger	lb.	.05¼@	.05¼
Para-Flux	gal.	.17 @	—
Petrolatum, white	lb.	.08 @	.08½
Pigmentaroil	gal.	.21 @	.36
Pine, steam distilled	gal.	.65 @	.70
destructively distilled	gal.	.55 @	.58
Witco Palm Oil	lb.	.11 @	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—

Resins and Pitches

Pitch, Burgundy	lb.	.06½@	.07½
coal tar	gal.	.05½@	.06
pine, 200 lb. gr. wt.	bbl.	9.00 @	10.00
Rosin, grade K, 280 lb. bbl.		— @	5.75
Pigmentar	lb.	.038 @	.0446
Tar Retort, 50 gal.	bbl.	13.50 @	15.00

Solvents

Acetone, pure	lb.	.11 @	.12
Alcohol denatured, No. 1 bbls.	gal.	.40 @	.44
Benzol, 90%	gal.	.21 @	.23
Carbon bisulphide	lb.	.05½@	.06¼
Carbon tetrachloride	lb.	.06¼@	.07
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.35 @	.40
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.45 @	.51
wood	gal.	— @	.44
destructively distilled	gal.	.40 @	.43

Waxes

Beeswax, white	lb.	.51 @	.53
Carnauba	lb.	.32 @	.34
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.06½@	.07
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30

Paraffin (c. l.—f.o.b. N. Y.)

Yellow crude scale	lb.	.02½@	—
White crude scale 124/126	lb.	.02½@	—
Refined, 125/127	lb.	.03¾@	—
Refined, 128/130	lb.	.03¾@	—
Refined, 135/137	lb.	.05¼@	—
Refined, 138/140	lb.	.07¼@	—

ANTI-OXIDANTS

Agerite, Resin	lb.		
Powder	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Neozone	lb.		
Oxynone	lb.	.68 @	.80
Resistox	lb.	.54 @	.57
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.66

SPECIALTIES

Sunproof	lb.	.35 @	.37½
Tonox	lb.	.56 @	.60

SUBSTITUTES

Black	lb.	.08 @	.14
White	lb.	.10 @	.16
Brown	lb.	.08 @	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03½@	.04½
Sulfur flour, Ref'n'd, 100% pure (bags)	cwt.	2.40 @	2.75
Commercial (bags)	cwt.	1.75 @	2.10
Vandex	lb.		

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

THERE has been little in the statistical situation to encourage either rubber growers or manufacturers. Stocks of the crude commodity continue to increase slowly, while the amounts being invoiced weekly to the United States show no falling off. The total invoiced to this country in the week ended August 23 was the highest for a single week since early April.

English warehouse stocks had mounted to 110,400 tons by August 30, comparing with 109,272 tons as of August 16. American stocks at the end of August also were higher than at the close of July and may continue their rise through the present month.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available.

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More favorable reactions may be gained, however, from the fact that July gasoline consumption in this country was the highest on record, surpassing the previous peak month of August, 1929, and indicating that automobiles are being used today more than ever before. July tire figures, when released, will show the lowest production, highest shipments, and lowest inventories for the year.

Latest figures covering imports and exports from the leading producing and consuming countries have been added to the appropriate tables in this section.

U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	16.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,328	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,307	54.63	17,671	23,476,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,715,488	39.76	398,483
1928	439,731	344,554,973	25.03	32,189	18,128,861	25.17	407,572
1929	560,084	239,173,783	19.15	36,485	16,868,733	20.64	523,599
1927:							
July	37,677	31,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	35.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	27,671
Nov.	28,592	27,395,428	31.69	2,469	2,014,196	36.43	26,123
Dec.	30,737	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,107	30,278,444	34.56	1,988	1,734,990	38.95	37,119
Feb.	33,663	27,763,655	36.82	2,738	2,229,589	36.35	30,925
Mar.	40,611	32,103,042	35.29	3,718	2,587,485	31.07	36,893
Apr.	37,935	27,287,266	32.11	2,272	1,415,024	27.80	35,663
May	31,059	19,058,672	27.39	2,399	1,386,307	25.80	28,660
June	27,765	14,121,219	22.71	2,621	1,400,697	23.86	25,144
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,084,646	20.37	28,827
Sept.	39,235	16,512,019	18.50	3,038	1,384,148	20.34	36,797
Oct.	44,058	18,200,332	18.44	2,405	1,085,407	20.15	41,653
Nov.	36,519	14,878,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,738	1,165,743	19.00	40,773
1929:							
Jan.	57,844	22,872,943	17.74	3,663	1,773,401	21.61	53,901
Feb.	64,265	24,760,111	17.20	2,955	1,374,783	20.77	61,310
Mar.	90,694	29,380,905	17.98	4,218	2,094,027	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.02	52,432
May	51,161	24,355,511	21.25	2,336	1,349,690	21.24	48,825
June	41,663	18,799,307	20.14	3,153	1,470,746	20.83	38,511
July	43,944	19,342,147	19.65	3,424	1,590,411	20.73	40,520
Aug.	37,222	16,530,990	19.83	2,644	1,282,217	20.80	34,578
Sept.	34,472	15,214,485	19.70	2,011	861,068	19.11	32,461
Oct.	36,163	16,192,261	18.94	2,614	1,190,510	20.33	35,549
Nov.	43,507	18,189,305	18.66	2,929	1,300,354	19.82	40,578
Dec.	42,952	17,573,330	18.27	2,745	1,007,279	16.38	40,207
1930:							
Jan.	47,496	17,793,563	16.72	3,144	1,077,415	15.30	44,352
Feb.	42,687	14,798,240	15.48	2,280	960,790	18.80	40,407
Mar.	44,976	14,653,243	14.54	3,187	1,192,708	16.71	41,789
Apr.	45,423	14,783,605	14.53	2,688	892,532	14.82	42,735
May	42,692	13,373,232	13.98	3,154	1,085,432	15.37	39,538
June	39,993	12,215,848	13.79	3,125	1,027,136	14.67	36,868

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1923	1924	1925	1926	1927	1928	1929	1930
Jan.	30,106	29,058	29,638	32,196	31,518	34,403	43,002	36,689
Feb.	30,149	25,736	29,761	31,136	30,137	33,702	41,594	32,726
Mar.	36,629	28,385	33,498	32,956	36,141	35,688	44,730	35,914
Apr.	29,085	27,129	34,139	32,696	35,871	32,772	47,521	40,207
May	36,155	25,845	35,322	29,364	34,592	37,333	49,233	39,902
June	24,272	22,753	35,822	28,598	33,801	37,676	43,227	34,463
July	17,685	23,396	36,053	27,577	29,219	37,407	41,526	29,894
Aug.	20,359	28,982	35,909	34,533	33,460	42,927	38,274	
Sept.	17,594	31,497	31,691	32,904	27,214	39,882	34,707	
Oct.	21,321	31,520	29,047	29,836	26,790	40,857	34,800	
Nov.	20,437	27,289	28,853	28,080	26,792	37,461	27,659	
Dec.	31,902	27,199	28,748	26,293	25,492	31,232	23,531	
Totals	305,694	328,769	388,481	366,149	371,027	441,340	469,804	

Figures on Quarterly Basis

Quarter	1923	1924	1925	1926	1927	1928	1929	1930
Jan./Mar.	96,776	87,609	95,263	94,301	99,216	103,558	128,565	101,610
Apr./June	89,493	75,674	104,099	87,109	103,242	103,500	139,292	112,092
July/Sept.	55,621	83,813	99,493	93,793	89,210	117,573	113,746	
Oct./Dec.	63,617	92,656	85,789	83,212	80,860	117,597	84,572	
Totals	305,507	339,752	384,644	358,415	372,528	442,227	466,475	

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
June 14	5,938	631	1,586	63	8,218
June 21	5,823	886	1,693	36	8,438
June 28	6,732	710	921	10	8,373
July 5	5,878	724	1,772	—	8,374
July 12	6,594	315	1,537	6	8,452
July 19	4,898	270	1,317	22	6,507
July 26	5,495	435	1,521	—	7,451
August 2	6,531	914	996	7	8,448
August 9	5,397	914	1,939	—	8,250
August 16	6,177	820	1,810	25	8,832
August 23	7,498	488	1,503	—	9,489
August 30	5,796	1,043	1,662	—	8,501

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—New York Market, in Cents per Pound

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—New York Market, in Cents per Pound

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
1928																																
April		27¾	27½	21½	21¼																											19
May		17⅜	18½	19½	19¾																											19½
June		19⅜																														19¾
July																																18⅞
August		19½	18⅜	19¾	19¾																											18¾
September																																18¾
October			18⅜	18½	18¾																											18¾
November			18¾	18¾	18¾																											18¾
December			17¾	17¾	17¾																											18
1929																																
January		—	18¼	18¼	18¼																											18¼
February		21¾	22	21¾	22¾																											18¾
March		26	26	26	26																											18¼
April		23	23½	22⅝	22½																											18
May		19⅜	19⅝	19⅜	19⅜																											
June		21½	19⅜	19¾	19¾																											
July		20¾	21¾	21¾	21¾																											
Aug.		21¾	21	21	21																											
Sept.		21¾	19½	19¾	20¼																											
Oct.			19½	19⅝	19⅞																											
Nov.		19⅞	17⅝	17⅝	17⅝																											
Dec.		—		16¼	16¼																											
1930																																
January		15¾		16⅞	15⅝																											
February		15⅜		15	15																											
March		16⅝		15⅜	15⅝																											
April		16⅝		15¼	15¼																											
May		14⅞		14⅝	14⅝																											
June																																
July		12¾		13¾	13⅞																											
August		10⅝		12¾	12																											
September				9⅝	9⅝																											

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.80	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	36.30
1913	82.04	1917	72.23	1921	16.56

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14	15.24
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97	15.35
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55	15.34
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.18	14.98
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46	14.24
June	15.11	26.58	18.81	77.26	42.50	37.25	19.59	20.64	12.45
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30	11.24
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	20.59	9.96
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	20.27	—
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	19.67	—
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	18.26	16.62	—
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	16.12	—
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	22.48	20.55	—

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1	—	6⅛	5¼	—	17	6⅛	5½	—	—
2	6⅝	6⅛	5⅛	4¾	18	6	5⅝	4¾	—
3	6⅝	6⅛	—	4⅝	19	6	5⅝	4¾	—
4	6⅝	6¼	5¼	—	20	6	—	4¾	—
5	6⅝	6⅛	5	—	21	6	5⅝	4⅞	—
6	6⅝	—	5	—	22	—	5⅝	4¾	—
7	—	6⅛	5	—	23	5⅞	5⅝	4¾	—
8	—	6	5	—	24	6⅛	5½	—	—
9	—	5⅞	5	—	25	6⅛	5⅝	4¾	—
10	6⅛	5⅞	—	—	26	6¼	5⅝	4¾	—
11	6⅛	5⅞	4⅞	—	27	6⅛	—	4¾	—
12	6⅛	5¾	4¾	—	28	6¼	5¼	4¾	—
13	6¼	—	4¾	—	29	—	5¼	4¾	—
14	6⅛	5⅝	4⅞	—	30	6¼	5¼	—	—
15	—	5⅝	5	—	31	—	5¼	—	—
16	6⅛	5½	4⅞	—					

Average Monthly Price Per Pound

Month	1928 Pence	1929 Pence	1930 Pence	Month	1928 Pence	1929 Pence	1930 Pence
Jan.	19.310	9.942	7.471	Aug.	9.300	10.505	4.880
Feb.	15.713	11.875	7.948	Sept.	8.530	10.160	—
Mar.	12.736	12.135	7.595	Oct.	8.807	9.620	—
Apr.	8.864	10.490	7.391	Nov.	8.596	8.442	—
May	8.845	10.717	6.926	Dec.	8.570	7.958	—
June	9.293	10.580	6.195	Average for Year	10.656	10.291	—
July	9.312	11.065	5.648				

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	Aug.	Sept.	Day of Month	Aug.	Sept.	Day of Month	Aug.	Sept.
1	12.80	—	11	12.55	—	21	11.15	—
2	12.85	11.30	12	12.35	—	22	11.15	—
3	—	11.40	13	12.40	—	23	11.25	—
4	13.10	—	14	12.05	—	24	—	—
5	12.85	—	15	11.90	—	25	11.45	—
6	12.95	—	16	11.60	—	26	11.75	—
7	13.15	—	17	—	—	27	11.70	—
8	12.55	—	18	11.00	—	28	11.70	—
9	12.60	—	19	11.25	—	29	11.40	—
10	—	—	20	11.35	—	30	—	—
						31	—	—

Average Monthly Price Per Pound

Month	1928 Cents	1929 Cents	1930 Cents	Month	1928 Cents	1929 Cents	1930 Cents
Jan.	19.12	20.22	17.21	Aug.	19.28	18.62	12.03
Feb.	18.40	20.21	15.62	Sept.	18.67	18.83	—
Mar.	19.38	20.19	15.13	Oct.	19.62	18.46	—
Apr.	20.63	20.29	16.39	Nov.	19.84	17.53	—
May	21.58	19.41	16.43	Dec.	20.22	17.28	—
June	21.50	18.74	14.48	Average for Year	19.97	19.03	—
July	21.36	18.62	13.10				

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND			AFLOAT			ON HAND AND AFLOAT		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	110,244	76,842	126,068	46,441	93,330	65,483	156,685	169,672	191,551
Feb.	108,955	90,058	134,790	48,044	75,780	71,015	156,999	165,848	205,805
Mar.	114,061	100,536	141,843	43,378	67,065	63,646	157,439	167,601	205,489
Apr.	113,083	107,659	148,272	32,783	65,798	63,261	145,866	173,457	211,533
May	105,356	97,192	146,179	33,145	65,793	68,168	138,501	162,985	214,347
June	90,198	92,061	151,485	38,392	54,668	58,657	128,590	146,729	210,142
July	83,242	92,535	152,001	42,943	46,145	58,326	126,185	138,680	210,327
Aug.	68,994	90,769		54,904	49,423		123,898	140,192	
Sept.	68,851	84,362		52,692	55,758		121,543	140,120	
Oct.	66,421	88,483		45,646	59,180		112,067	147,663	
Nov.	61,956	92,219		75,502	62,358		137,458	154,577	
Dec.	66,166	118,609		92,037	62,388		158,203	180,997	

(Rubber Manufacturers' Association figures raised to 100%.)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1928	1929	1930	At end of	1928	1929	1930
Jan.	66,524	25,191	60,434	July	35,429	30,080	
Feb.	62,964	25,554	64,557	Aug.	32,084	35,605	
Mar.	58,272	28,214	68,923	Sept.	31,440	42,188	
Apr.	53,425	31,368	74,676	Oct.	24,207	47,803	
May	44,628	31,290	77,812	Nov.	17,775	52,454	
June	38,756	31,025	80,260	Dec.	19,815	54,304	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1930					
March	64,383	66,418	66,885	68,404	69,233
April	71,477	72,333	73,252	74,084	
May	75,540	76,118	76,932	76,953	77,198
June	77,616	78,104	78,388	79,699	
July	80,060	80,501	80,814	80,845	
August	80,379	80,044	80,224	80,618	80,611

Stocks in Liverpool

1930					
March	20,693	20,727	20,849	21,187	21,198
April	22,008	22,676	22,663	23,546	
May	23,877	23,755	24,448	24,722	25,526
June	25,320	26,646	27,354	27,493	
July	28,148	28,226	28,126	28,381	
August	28,404	28,660	29,048	29,673	29,789

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1928	1929	1930	End of	1928	1929	1930
Jan.	25,868	29,617	39,727	July	18,663	33,859	45,459
Feb.	22,867	32,373	44,371	Aug.	18,971	30,834	—
Mar.	20,538	29,437	45,657	Sept.	14,898	32,138	—
Apr.	16,946	26,474	48,473	Oct.	12,149	33,770	—
May	17,437	30,764	44,715	Nov.	29,188	30,963	—
June	18,207	30,403	42,451	Dec.	32,895	35,548	—

STOCKS IN OTHER CENTRES

1930 End of	Malaya Mainland	Afloat for Europe[1]	Holland	Colombo	Para and Manaos
Jan.	44,740	28,440	2,134	5,400	3,663
Feb.	41,955	28,180	2,159	5,000	4,370
Mar.	39,206	27,510	2,220	4,759	4,578
Apr.	39,758	23,580	2,204	4,000	4,482
May	26,482	22,730	2,308	4,000	4,388
June	26,578	16,095		3,856	4,588

(1) Reported by U. S. Department of Commerce.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1922	16,297,735	0.0	1926	24,199,524	78.3
1923	23,140,620	0.6	1927	19,700,003	79.1
1924	21,863,311	19.7	1928	24,247,282	81.6
1925	26,001,664	66.8	1929	24,141,502	80.3
1930			1930		
January	1,601,326	84.0	July	1,449,161	80.7
February	1,653,421	78.9	August		
March	2,061,999	79.1	September		
April	2,339,884	81.1	October		
May	2,010,067	84.3	November		
June	1,338,226	83.5	December		

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	40,932	45,259	51,633	60,845	61,237	64,439	77,944	73,308
Shipments	39,987	45,204	50,120	59,262	59,002	64,059	74,296	74,021
Inventory[2]	6,132	5,772	7,427	8,142	10,456	10,264	13,624	12,627

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,358	6,722	4,745	5,394	6,626	4,701	9,949	13,712	12,719
Feb.	6,363	6,912	4,859	5,031	5,282	4,474	11,721	15,495	13,238
Mar.	6,819	7,519	5,188	5,731	6,708	5,032	12,389	16,351	13,469
Apr.	6,178	7,884	6,024	5,812	7,294	5,429	12,717	16,929	13,948
May	6,759	8,145	6,099	6,457	7,184	5,564	13,024	17,849	14,327
June	6,692	7,804	5,464	7,117	7,254	5,647	12,162	17,957	14,163
July	6,498	6,475	—	7,895	7,855	—	11,157	15,830	—
Aug.	7,469	5,806	—	8,403	7,845	—	10,034	14,226	—
Sept.	6,802	4,758	—	7,145	5,998	—	9,765	12,875	—
Oct.	7,326	4,919	—	5,717	4,960	—	11,520	12,845	—
Nov.	6,075	3,603	—	4,998	3,558	—	12,579	12,935	—
Dec.	5,605	3,261	—	4,591	3,846	—	13,624	12,627	—

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	50,850	60,116	70,706	82,614	76,618	70,823	80,180	73,417
Shipments	49,673	59,072	68,016	81,004	71,591	72,896	77,127	75,298
Inventory[2]	7,643	8,425	11,052	11,313	16,200	13,692	16,117	13,660

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,441	6,517	4,914	6,072	7,242	5,181	12,982	15,386	13,551
Feb.	6,895	6,769	4,943	5,431	5,278	4,627	14,650	16,999	13,905
Mar.	6,231	7,466	5,271	5,731	6,737	5,042	15,578	17,750	14,057
Apr.	6,661	7,634	5,877	5,702	7,164	5,172	16,638	18,134	14,704
May	7,168	7,660	5,904	6,300	7,038	5,412	17,702	18,928	14,775
June	6,953	6,978	5,280	7,136	6,950	5,616	17,159	17,741	14,518
July	6,674	6,178	—	8,729	8,113	—	14,974	16,332	—
Aug.	8,343	5,846	—	9,350	8,183	—	13,931	14,157	—
Sept.	7,103	5,536	—	7,154	6,250	—	13,543	13,424	—
Oct.	6,929	5,310	—	5,662	5,001	—	15,285	13,656	—
Nov.	5,592	3,780	—	5,002	3,712	—	15,742	13,701	—
Dec.	5,184	3,716	—	4,858	3,631	—	16,117	13,660	—

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			Grand Total
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	
1923	4,020,255	3,631,728	388,527	146,438	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	453,019	179,426	146,970	32,456	3,573,313
1929							
Jan.	402,154	350,617	51,537	21,501	17,164	4,337	423,655
Feb.	466,084	407,589	58,495	31,287	25,584	5,703	497,371
March	584,733	513,266	69,559	40,621	32,833	7,788	625,354
April	620,656	538,679	81,977	41,901	34,392	7,509	662,557
May	603,969	516,055	86,596	31,559	25,129	6,430	635,528
June	545,252	453,956	91,296	21,492	16,511	4,981	566,744
July	500,381	427,213	73,118	17,461	13,600	3,861	517,792
Aug.	499,629	444,711	54,918	14,214	11,037	3,177	513,843
Sept.	415,332	365,651	49,681	13,817	10,710	3,107	429,149
Oct.	380,011	321,195	58,816	14,523	8,975	5,548	394,534
Nov.	217,570	170,928	46,642	9,424	7,187	2,237	226,994
Dec.	119,950	92,717	27,233	5,495	4,426	1,069	125,445
TOTAL	5,358,361	4,603,609	754,752	263,295	207,498	55,797	5,621,656
1930							
Jan.	273,089	235,099	37,990	10,388	8,856	1,532	283,477
Feb.	323,962	276,833	47,129	15,548	13,021	2,527	339,510
March	401,378	336,178	64,200	20,730	17,165	3,565	422,108
April	442,630	375,171	67,459	24,257	20,872	3,385	466,887
May	417,154	362,784	54,370	24,672	21,251	3,421	441,826
June	335,475	289,704	45,771	15,090	12,194	2,896	350,565
July	262,363	222,700	39,663	10,188	8,556	1,632	272,551
Aug.							
Sept.							
Oct.							
Nov.							
Dec.							

Exports of Crude Rubber from Principal Producing Countries

(*Long Tons*)

	BRITISH MALAYA[1]								DUTCH EAST INDIES[1]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[5]	Amazon Valley	All Other[4]	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	82,980	46,344	57,822	5,067	16,765	7,856	406,958
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,523
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1928:															
May	26,483	10,350	16,133	3,091	654	842	494	241	4,943	5,355	10,347	717	2,602	1,135	45,994
June	22,994	16,168	6,826	3,107	963	926	494	451	5,419	5,863	13,655	725	1,399	960	40,788
July	30,481	13,383	17,098	5,129	1,043	905	593	366	5,602	7,566	11,594	698	1,264	873	52,731
Aug.	35,674	15,114	20,560	5,720	398	1,227	593	544	5,668	7,438	11,893	712	1,732	450	56,936
Sept.	29,769	11,239	18,530	4,675	457	938	594	447	4,956	6,536	9,863	969	1,614	494	50,073
Oct.	24,476	12,603	11,873	3,999	864	949	564	457	5,295	7,474	10,124	513	1,399	732	44,243
Nov.	68,135	10,436	57,699	8,005	1,048	772	564	425	4,950	7,902	7,805	943	1,790	623	92,526
Dec.	66,763	11,122	55,641	7,848	1,113	744	565	294	5,120	8,792	10,896	948	2,220	588	94,769
1929:															
n.	52,546	13,415	39,131	5,301	1,664	873	600	461	5,640	8,067	11,076	850	2,184	642	79,439
eb.	47,926	12,103	35,823	7,064	1,117	955	600	495	6,572	7,511	10,384	807	2,104	520	73,962
Mar.	49,448	14,553	34,895	6,583	1,413	758	601	499	5,515	6,620	10,629	658	2,332	786	71,289
Apr.	49,816	11,414	38,402	5,097	727	747	548	306	5,997	6,645	11,321	673	1,959	569	72,982
May	43,960	15,593	28,367	5,723	800	966	548	453	6,264	6,961	13,487	1,059	1,922	733	67,233
June	40,398	14,344	26,054	5,563	1,122	1,061	547	422	5,582	6,693	11,270	757	1,398	548	61,017
July	46,454	15,071	31,383	5,457	974	1,247	641	462	6,422	7,192	13,995	575	1,457	543	70,348
Aug.	50,441	15,469	34,972	6,079	685	993	641	431	4,644	7,298	10,782	1,032	1,563	499	69,619
Sept.	53,484	12,392	41,092	7,993	384	832	640	406	4,708	7,517	10,149	655	1,566	504	76,446
Oct.	47,937	12,516	35,421	8,381	812	1,047	671	485	4,697	8,295	10,512	893	1,606	445	73,265
Nov.	46,279	11,204	35,075	6,660	1,065	668	672	278	4,760	6,711	9,380	771	1,442	585	68,017
Dec.	46,147	15,018	31,129	8,683	900	930	672	320	5,189	8,279	11,102	966	1,674	443	70,287
1930:															
Jan.	52,585	11,773	40,762	7,741	1,560	791	600*	386	5,709	7,831	8,920	856	1,837	585	77,578*
Feb.	48,947	12,960	35,987	7,825	1,245	847	600*	469	6,900	7,191	11,414	944	1,797	480	75,599*
Mar.	47,320	13,236	34,084	6,269	1,129	976	600*	391	5,796	6,612	11,070	643	1,674	536	69,780*
Apr.	45,517	16,381	29,186	5,030	856	1,026	600*	366	4,802	6,326	12,582	433	1,201	630	63,038*
May	49,388	36,135	13,253	5,947	975	917	600*	350	6,352	6,661	11,916	753	1,383	555	49,662*
June	36,657	12,120	24,537	4,152	778	1,040	600*	392	4,728	4,776	9,512	425	974	551	52,465*
July	41,347	12,754	28,588	4,619											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,459 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ee)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	8,995	2,771	3,149	2,418	9	342,373
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	8,840	5,510	2,292	2,008	567	376,641
1921	179,678	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	-8,807	1,778	589	567	395,885
1923	300,372	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	-11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	-807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,493
1926	395,667	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	613,643
1927	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,499	6,482	636	4,224	2,095	2,072	627,789
1928	404,496	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,486	7,958	2,243	4,418	3,178	3,183	596,895
1929	526,709	122,675	55,093	49,275	35,458	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	892,789
1928:															
May	28,660	—5,322	3,297	2,944	2,180	2,288	1,090	3,893	655	746	209	485	220	213	41,558
June	25,143	—3,031	3,597	2,968	2,186	2,102	984	4,111	348	743	123	346	251	182	40,063
July	28,170	—1,874	3,518	3,387	2,692	2,026	1,598	724	591	895	395	294	175	884	43,475
Aug.	28,827	48	3,527	2,744	2,447	1,868	875	632	707	519	316	359	58	94	43,021
Sept.	36,800	4,199	3,524	3,553	2,812	1,837	1,278	20	603	597	345	377	277	235	56,457
Oct.	41,667	—934	3,728	4,386	2,943	3,711	1,049	98	766	696	141	527	250	318	59,246
Nov.	33,846	—3,141	3,278	3,694	2,799	2,150	1,340	689	827	544	81	357	252	282	46,988
Dec.	40,781	8,438	3,633	2,470	2,618	3,002	1,145	1,378	755	639	148	435	263	200	65,905
1929:															
Jan.	53,922	11,951	5,645	4,711	3,759	3,776	1,481	956	1,061	749	218	638	179	525	89,571
Feb.	61,331	5,179	5,001	4,613	2,966	2,727	1,259	684	1,131	627	113	226	115	356	86,270
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	316	354	80	409	77,091
Apr.	52,447	8,295	4,854	5,351	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,395
May	48,350	5,112	3,152	3,682	2,937	2,314	1,417	996	1,437	854	201	468	37	277	71,234
June	38,676	4,787	6,814	3,948	3,075	1,593	1,624	695	2,215	672	687	507	24	420	65,737
July	40,914	4,993	4,339	3,559	3,205	2,388	2,023	1,056	2,918	1,039	253	519	30	465	68,201
Aug.	35,207	14,594	4,645	4,082	2,879	3,663	908	1,234	724	902	254	429	25	319	69,865
Sept.	32,171	17,010	3,889	4,691	1,908	3,511	1,224	1,235	853	672	253	361	91	477	68,346
Oct.	35,840	16,111	4,489	3,355	1,821	3,902	1,838	1,073	1,125	1,147	278	710	91	201	71,981
Nov.	40,972	13,141	3,082	3,776	2,709	3,221	1,275	1,226	1,453	361	253	595	62	313	72,439
Dec.	40,488	12,434	4,274	2,921	2,114	2,251	1,198	1,200	726	741	52	677	90	443	69,609
1930:															
Jan.	44,759	11,106	4,207	3,862	2,842	2,805	910	826	332	612	209	552	200*	577	73,799
Feb.	40,718	10,293	4,482	3,697	2,250	1,386	1,385	2,705	457	1,143	188	315	200*	239	69,458
Mar.	42,068	12,346	4,354	4,289	3,776	2,663	1,083	168	975	678	358	322	200*	263	73,543
Apr.	42,961	13,058	4,962	4,488	2,303	2,769	2,067	949	673	1,431	158	461	200*	255	76,735
May	40,287	9,861	5,276	4,379	2,593	2,699	1,279	1,689	64	1,250	230	274	200*	346	70,427
June	37,257	9,645		3,794	2,579		1,378		67	691	343	507			
July		7,650		3,395			197								

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are not included in this compilation; such imports amounted to 4,305 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 1,231 tons in 1929. *Figure is provisional; final figure will be shown immediately it becomes available.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics Yards	Rubber Heels Pairs	Rubber Soles Pairs	Mechanical Goods Shipments Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	23,988,000	206,970,000	16,211,630 (2)	64,277,000
1926	29,226,000	183,312,000	12,253,000	76,789,000
1927	37,572,000	201,914,000	27,168,000	68,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1929	50,781,000	232,126,000	34,499,000	74,770,000
1929:				
August	5,085,000	23,095,000	2,948,000	6,792,000
September	5,507,000	21,702,000	2,841,000	5,906,000
October	6,116,000	22,386,000	3,502,000	5,887,000
November	4,395,000	17,863,000	3,400,000	4,932,000
December	2,291,000	14,781,000	3,003,000	4,751,000
1930:				
January	3,281,000	15,470,000	3,496,000	5,169,000
February	3,441,000	14,172,000	2,338,000	5,376,000
March	3,570,000	15,439,000	2,582,000	5,981,000
April	4,029,000	17,762,000	2,593,000	5,989,000
May	3,775,000	15,603,000	1,939,000	6,183,000
June				5,318,000

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Gutta Percha	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1919	1,480	760,690	727	937,088	6,332	2,218,964	2,900	1,068,698
1920	758	845,985	1,064	1,260,048	5,672	2,068,501	3,183	1,520,809
1921	58	26,946	814	1,077,859	1,745	851,893	985	333,564
1922	127	57,040	812	978,765	2,335	403,812	818	281,012
1923	1,155	542,227	700	898,524	4,565	853,308	912	375,167
1924	1,356	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	1,603	629,284
1926	4,395	2,562,096	354	327,218	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,795	2,448,657	1,494	728,172
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	1,597	777,128
1929	1,231	545,175	728	566,964	8,203	2,458,126	447	167,479
1929:								
July	200	86,175	49	45,440	572	180,065	14	5,807
Aug	190	80,443	58	47,769	575	171,733	—	—
Sept.	107	51,156	38	30,327	918	279,225	—	—
Oct.	200	79,968	58	43,756	686	181,421	—	—
Nov.	125	47,796	13	11,600	583	182,677	49	14,935
Dec.	100	41,328	25	19,955	550	156,939	51	12,095
1930:								
Jan.	150	55,272	28	28,549	509	141,384	—	—
Feb.	75	25,956	52	45,319	367	93,087	—	—
Mar.	148	50,007	16	12,498	522	128,844	—	—
Apr.	75	19,856	58	54,548	410	103,089	—	—
May	172	57,760	17	13,645	602	144,415	—	—
June	168	51,561	52	47,000	532	120,424	45	16,649

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption Tons	% to Crude	Stocks*	Year	Production	Consumption Tons	% to Crude	Stocks*
1920	86,395	75,297	38.4	.....	1925	132,930	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,334	54,456	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1928:									
Jan.	14,862	20,140	58.5	21,941	July	17,278	19,070	51.0	17,305
Feb.	15,291	18,670	55.4	20,848	Aug.	19,049	17,890	41.7	15,381
Mar.	17,969	20,680	57.9	19,558	Sept.	18,693	17,795	44.6	17,991
Apr.	15,893	19,280	58.8	19,283	Oct.	17,182	18,420	45.1	17,026
May	18,945	20,215	54.1	18,187	Nov.	18,245	18,380	49.1	22,899
June	18,781	18,140	48.2	18,709	Dec.	17,728	14,320	45.9	24,785
1929:									
Jan.	18,685	21,068	49.1	24,394	July	18,387	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.	19,787	18,220	47.6	22,309
Mar.	19,984	20,867	46.7	22,076	Sept.	18,660	17,071	49.2	24,984
Apr.	19,899	22,435	47.8	20,680	Oct.	18,865	18,744	53.8	25,117
May	20,385	23,176	47.1	19,479	Nov.	14,363	15,330	55.4	26,080
June	18,416	18,141	42.0	17,980	Dec.	13,429	11,531	49.0	27,464
1930:									
Jan.	15,010	17,454	47.6	24,241	July	.....	.....	.....	.....
Feb.	15,846	14,559	44.5	24,243	Aug.	.....	.....	.....	.....
Mar.	17,400	15,241	42.2	24,415	Sept.	.....	.....	.....	.....
Apr.	17,828	16,904	42.0	24,587	Oct.	.....	.....	.....	.....
May	17,812	17,052	42.7	23,356	Nov.	.....	.....	.....	.....
June	15,714	14,063	40.8	24,449	Dec.	.....	.....	.....	.....

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927, 9,577 tons in 1928, and 12,369 tons in 1929.

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1929	1930	MONTHS	1929	1930
January	22,602,000	25,731,000	July	36,860,000	38,352,000
February	22,776,000	26,509,000	August	37,759,000	
March	28,495,000	31,029,000	September	34,193,000	
April	32,019,000	34,549,000	October	32,816,000	
May	34,117,000	36,497,000	November	31,502,000	
June	33,163,000	35,902,000	December	26,550,000	

REVIEW DESK

Books, New Publications, Catalogues, Etc.

RUBBER INFORMATION. Edited by J. B. Cronshaw. Published by Leonard Hill, Ltd., 231 Strand, W. C. 2, London, England. 1930. 236 pp. 10s.

Claiming to be "a compendium of the rubber industry in all its branches," this volume is comprehensive in size and, for the most part, accurate in its contents due to the services of a group of well-known rubber men in its compilation. A technical dictionary of about 100 pages, including many references to original papers, is followed by a list of rubber chemicals and compounding materials with important data relating to each. A statistical section includes a summary of the financial reports of plantation companies. The volume is concluded by lists of products, equipment, trade names and manufacturers, the last mentioned being unfortunately incomplete and lacking in many of the principal British manufacturing plants.

ALUMINUM IN THE RUBBER INDUSTRY. Published by the British Aluminum Company, Ltd., Adelaide House, King William Street, London, E. C. 4, England. 1930. 44 pp. For free distribution.

The physical properties of aluminum make it a desirable metal for many uses in the rubber industry. Because of its lightness, strength and resistance to corrosion, it is used in making molds for footwear, rubber gloves and other items, for table covers, trays, mandrils, and even for latex cups, pails and coagulating pans on rubber plantations. These uses are described in detail in this manual, which also includes a 15-page appendix on the physical properties of aluminum, its chemical reactions, and the sizes and weights of aluminum sheets and tubes.

TECHNO-DICTIONARY. Compiled and published by Hubert Hermanns, Dahlemer Strasse 64A, Berlin-Lichterfelde-West, Germany. 1930. 432 pp. $3.75.

More than 8,000 technical words and phrases are arranged alphabetically in this pocket dictionary in the three languages of English, German and Italian with their equivalent in each case in the other two languages. It has been prepared especially for the readers of foreign technical periodicals, and the three sections are thumb indexed.

CARBON BLACK IN RUBBER INSULATING COMPOUNDS. By W. B. Wiegand and C. R. Boggs. Published by the Binney & Smith Company, 41 East 42nd Street, New York City. 1930. 10 pp. For free distribution.

Up to about 10 per cent by weight of properly made and dried carbon black may be added to each 100 parts of rubber hydrocarbon present in rubber insulating compounds with marked improvement in dielectric strength, resistivity, and power factor, and without serious increase in dielectric constant, according to the authors, who first presented this paper at the Rubber Division, A. C. S., meeting at Atlanta last April. Electrical improvements of up to 50 per cent are possible and are thought to be due to the removal by the carbon black of the ultimate traces of moisture and electrolytic impurities.

MICRONEX REVIEW. 1930. Chat No. 18 on the "Black" Art of Rubber Compounding. Published by the Binney & Smith Company, 41 East 42nd Street, New York City. 1930. 16 pp. For free distribution.

The research work done with Micronex carbon black is reviewed in this booklet, with particular attention given its use in insulating compounds and tire treads.

HOW "U. S." RUBBER GOODS ARE MADE. Pamphlet No. 1. Materials and Preliminary Processes. Published by the Educational Department, United States Rubber Company, 1790 Broadway, New York City. 1930. 8 pp. For free distribution.

The first of a series in which an attempt will be made to describe in non-technical language the methods employed in making the company's principal products, this pamphlet describes the different grades of crude rubber, discusses vulcanization in a few words, and lists some of the machines in general rubber factory use with their purposes.

FIVE YEARS OF RESEARCH IN INDUSTRY, 1926-1930. Published by the National Research Council, 29 West 39th Street, New York City. 1930. 91 pp. $.50.

This is a bibliography of papers dealing with industrial and scientific research in industry. There are 35 listings under the head of "Rubber" and many papers of interest listed under some of the general headings.